# Section 4: Risk Assessment

This section comprises the risk assessment portion of the Unifour Regional Hazard Mitigation Plan, including identification of hazards, hazard profiling and analysis, and assessment of vulnerability. It consists of the following six subsections:

4.1 Overview
4.2 Hazard Selection
4.3 Methodologies and Assumptions
4.4 Inventory of Community Assets
4.5 Hazard Profiles, Analysis, and Vulnerability
4.6 Conclusions on Hazard Risk

## 4.1 Overview

A risk assessment is performed to determine the potential impacts of hazards on the people, built and natural environments, and economy of a given planning area. The *Risk Assessment* provides the foundation for the rest of the mitigation planning process, which is focused on identifying and prioritizing actions to reduce risk to hazards. In addition to informing the *Mitigation Strategy*, the *Risk Assessment* can also be used to establish emergency preparedness and response priorities, for land use and comprehensive planning, and for decision making by elected officials, city and county departments, businesses, and organizations in the community.

A typical risk assessment consists of three primary components. Some form of hazard identification process needs to take place, followed by a detailed profiling of the hazards that will be addressed in the plan. Then the profiled hazards are assessed to determine the vulnerability of the planning area to each hazard being addressed. It is also important to document key details regarding the methodologies and assumptions used to perform the risk assessment, the asset inventories used to perform the risk assessment, and finally conclusions on hazard risk. The conclusions on hazard risk essentially consist of a prioritized ranking of hazards of concern.

## 4.2 Hazard Selection

The Unifour Region is vulnerable to a wide range of natural hazards that threaten life and property. Current regulations and interim guidance under the Disaster Mitigation Act of 2000 (DMA 2000) require, at a minimum, an evaluation of a full range of natural hazards.[1]

Upon a thorough review of the full range of natural hazards covered in the existing mitigation plans for the four participating counties in the Unifour area, the hazards suggested under FEMA mitigation planning guidance, and the hazards addressed in the North Carolina State Hazard Mitigation Plan, the participating jurisdictions in the Unifour Region have identified 12 hazards that are to be addressed in the Unifour Regional Hazard Mitigation Plan. These hazards were identified through an extensive process that included input from Unifour Hazard Mitigation Planning Committee (HMPC) members.

[1] An evaluation of human-caused hazards (e.g., technological hazards, terrorism, etc.) is permitted, though not required, for plan approval. The Unifour Region has chosen to focus solely on natural hazards for the purposes of this plan, except where technological hazards directly relate to a natural hazard (for example, a hazardous materials facility located in a mapped floodplain).

**Table 4.1** lists the full range of natural hazards initially considered for inclusion in the Plan. This table includes a total of 16 individual hazards and documents the evaluation process used for determining which of the initially identified hazards were considered significant enough for further evaluation in the *Risk Assessment*. For each hazard considered, the table indicates whether or not the hazard was identified as a significant hazard to be assessed further, how this determination was made, and why this determination was made. The table works to summarize not only those hazards that were identified (and why) but also those that were not identified (and why not).

**Table 4.1: Documentation of the Hazard Selection Process**

| Natural Hazard Considered | Was this hazard considered significant/appropriate enough to be addressed in the plan at this time? | How was this determination made? | Why was this determination made? |
|---|---|---|---|
| **ATMOSPHERIC HAZARDS** | | | |
| Hail | Yes, grouped with the thunderstorm hazard. | By consensus of the Unifour HMPC. | The threat of property damage from hail is of sufficient concern to warrant study. |
| Hurricane/Tropical Storm | Yes | By consensus of the Unifour HMPC. | Despite the inland location of the planning area, hurricanes and tropical storms are of sufficient concern to warrant study. |
| Lightning | Yes, grouped with the thunderstorm hazard. | By consensus of the Unifour HMPC. | The threat of property damage or loss of life from lightning is of sufficient concern to warrant study. |
| Nor'easter | No | By consensus of the Unifour HMPC. | No nor'easters are known to have significantly impacted the planning area in recent history. |
| Thunderstorm | Yes | By consensus of the Unifour HMPC. | The threat of damage from thunderstorms is of sufficient concern to warrant study. |
| Tornado | Yes | By consensus of the Unifour HMPC. | The threat of damage and loss of life from tornadoes is of sufficient concern to warrant study. |
| Winter Weather | Yes | By consensus of the Unifour HMPC. | The threat of damage and loss of life from winter weather is of sufficient concern to warrant study. |
| **HYDROLOGIC HAZARDS** | | | |
| Dam/Levee Failure | Yes | By consensus of the Unifour HMPC. | The threat of damage and loss of life from the failure of a dam or levee is of sufficient concern to warrant study. |

| Natural Hazard Considered | Was this hazard considered significant/appropriate enough to be addressed in the plan at this time? | How was this determination made? | Why was this determination made? |
|---|---|---|---|
| Drought/Extreme Heat | Yes | By consensus of the Unifour HMPC. | The threat of damage and loss of life from the drought and extreme heat hazard is of sufficient concern to warrant study. |
| Erosion | Yes | By consensus of the Unifour HMPC. | The threat of damage from erosion is of sufficient concern to warrant study. |
| Flood | Yes | By consensus of the Unifour HMPC. | The threat of damage and loss of life from flooding is of sufficient concern to warrant study. |
| **GEOLOGIC HAZARDS** | | | |
| Earthquake | Yes | By consensus of the Unifour HMPC. | Even though the threat of damaging earthquake activity in the planning area is relatively low, the threat of damage and loss of life from earthquakes within the state is of sufficient enough concern to warrant study. |
| Landslide | Yes | By consensus of the Unifour HMPC. | The threat of damage and loss of life from landslides is of sufficient concern to warrant study. |
| Sinkholes | Yes | By consensus of the Unifour HMPC. | Due to local concerns and recent occurrences. |
| **OTHER HAZARDS** | | | |
| Climate Change | Yes, but as a sub-factor of other hazards. | By consensus of the Unifour HMPC. | Prevailing thoughts are that it is more appropriate to address climate change in light of how it can exacerbate the effects of other natural hazards rather than addressed as a hazard in and of itself. |
| Wildfire | Yes | By consensus of the Unifour HMPC. | The threat of damage and loss of life from wildfires is of sufficient concern to warrant study. |

The final list of hazards to be presented in the Plan, as agreed upon by the HMPC, is as follows:

**Hydrologic Hazards (Water Hazards)**

- Flood
- Erosion
- Dam/Levee Failure
- Drought/Extreme Heat

**Atmospheric Hazards (Severe Storms)**

- Thunderstorm, Lightning, and Hail
- Tornado
- Winter Weather
- Hurricane and Tropical Storm

**Geologic Hazards**

- Landslide
- Earthquake
- Sinkhole

**Other Hazards**

- Wildfire

This list is repeated at the beginning of subsection 4.5.

Another consideration in the selection of the hazards to be addressed in the Plan is the history of major disaster declarations in the planning area. According to the FEMA Disaster Declarations web page, there have been 40 major disaster declarations issued in the state of North Carolina since 1954. Twelve of these declarations involved one or more of the counties included in the planning area (**Table 4.2**).

**Table 4.2: Major Disaster Declarations for Alexander, Burke, Caldwell, and Catawba Counties from 1954 to 2013**

| Event | Declaration Date | Declaration Number | County(s) in the Planning Area Declared |
|---|---|---|---|
| Tornadoes | 04/12/1974 | DR-428 | Burke, Caldwell |
| Severe Storms and Flooding | 11/09/1977 | DR-542 | Burke, Caldwell, Catawba |
| Tornadoes | 05/10/1989 | DR-827 | Catawba |
| Hurricane Hugo | 09/25/1989 | DR-844 | Alexander, Burke, Caldwell, Catawba |
| Blizzard of '96 | 01/13/1996 | DR-1087 | Alexander, Burke, Caldwell, Catawba |
| Storms/Flooding | 02/23/1996 | DR-1103 | Alexander, Burke, Caldwell, Catawba |
| Severe Ice Storm | 12/12/2002 | DR-1448 | Alexander, Burke, Caldwell, Catawba |
| Tropical Storm Frances | 09/10/2004 | DR-1546 | Alexander, Burke, Caldwell, Catawba |
| Hurricane Ivan | 09/18/2004 | DR-1553 | Burke, Caldwell |
| Severe Winter Storms and Flooding | 02/02/2010 | DR-1871 | Burke, Caldwell |
| Severe Storms, Flooding, Landslides, and Mudslides | 09/25/2013 | DR-4146 | Burke, Caldwell |
| Severe Storms, Flooding, Landslides, and Mudslides | 10/29/2013 | DR-4153 | Catawba |

*Source: Federal Emergency Management Agency.*

As shown in Table 4.2, the earliest major disaster declaration to occur in the planning area was in 1974. The last were in 2013. The 12 major disaster declarations shown above cover the hazards of flood, hurricane/tropical storm, severe storms, severe winter weather, and tornado relevant to the planning area. This history of disaster declarations is consistent with the hazards identified by the HMPC to be addressed in the Plan.

## 4.3 Methodologies and Assumptions

Certain assumptions are inherent in any risk assessment. For the Unifour Regional Hazard Mitigation Plan, three primary assumptions were discussed by the HMPC from the beginning of the risk assessment process: (1) that the best readily available data would be used, (2) that the hazard data selected for use is reasonably accurate for mitigation planning purposes, and (3) that the risk assessment will be regional in nature with local, municipal-level data provided where appropriate and practical.

The following list provides key points by hazard type that are relevant to understanding the risk assessment presented in this section:

### Flood

- Pre-FIRM[2] buildings have been selected as a subset of at-risk buildings following the assumption that structures built prior to the community joining the National Flood Insurance Program (NFIP) are likely to be at greater risk than post-FIRM buildings.
- If the NFIP entry date for a given community is between January and June, buildings constructed the same year as the entry date are considered to be post-FIRM (e.g., if the NFIP entry date is 02/01/1991, buildings constructed in 1990 and before are pre-FIRM. Buildings constructed from 1991 to the present are post-FIRM.). If the NFIP entry date is between July and December, then the following year applies for the year built cut-off (e.g., if the NFIP entry date is 12/18/2007, buildings constructed in the year 2007 and before are pre-FIRM, 2008 and newer are post-FIRM).
- Effective FEMA DFIRM data was used for the flood hazard areas. Flood zones used in the analysis consist of Zone AE (1-percent-annual-chance flood), Zone AE Floodway, and the 0.2-percent-annual-chance flood hazard area.
- Building footprints were received from all four participating counties. To refine the results, footprints with an area less than 500 square feet were excluded from the analysis. To determine if a building is in a hazard area, the building footprints were intersected with each of the mapped hazard areas. If a building intersects two or more hazard areas (such as the 1-percent-annual-chance flood zone and the 0.2-percent-annual-chance flood zone), it is counted as being in the hazard area of highest risk.
- Parcels were received from all four participating counties. The parcel data provided building value and year built. Building value was used to determine the value of buildings at risk. Year built was used to determine if the building was constructed prior to or after the community had joined the NFIP and had an effective FIRM and building codes enforced.

[2] A Flood Insurance Rate Map (FIRM) is the official map of a community on which is delineated both the special hazard areas and the risk premium zones applicable to the community.

- Census blocks and Summary File 1 from the 2010 Census were used to determine population at risk. This included the total population, as well as the vulnerable elderly and children age groups. To determine population at risk, the census blocks were intersected with the hazard area. To better determine the actual number of people at risk, the intersecting area of the census block was calculated and divided by the total area of the census block to determine a ratio of area at risk. This ratio was applied to the population of the census block. For example, a census block has a population of 400 people. Five percent of the census block intersects the 1-percent-annual-chance flood hazard area. The ratio estimates that 20 people are then at risk within the 1-percent-annual-chance flood hazard area (5% of the total population for that census block).
- Limitations: There can be multiple buildings located on one parcel. However, the parcel only provides one value for building value and year built, and it is not known from the provided data if the building value is cumulative or for the primary structure on the parcel. For the analysis, building value was only counted once per parcel, regardless of the number of structures. This was done to prevent grossly over-estimating the value of buildings at risk. For example, a parcel has three buildings with a value of $300,000. If two of those buildings intersect the 1-percent-annual-chance flood hazard area, the assumed building value at risk is $300,000 not $600,000. Even though only two out of three buildings are at risk, there is no way to determine the individual value of each building, so the building value for the whole parcel is counted. The value at risk is also the value of the entire building, and does not take into account flood damage based on elevation, number of floors, or value of contents.

## Lightning

- Based on NCDC data, the number of cloud-to-ground lightning flashes was calculated for each day, month, and year as well as for the 1986-to-present period of record. Additionally, the number of flashes was calculated for each hour and summarized by month, year, and period of record. Grids were created to show only positive polarity flashes for all time periods. The summary grids are defined as a 4 km Albers Equal Area grid, fit to the continental United States. The data was re-sampled to 150-meter cells using bilinear interpolation (for cartographic purposes).
- Average annual lightning strikes are the 25-year-average of annual average lightning strikes from 1987-2012. Accuracy depends on the distribution of lightning detection sensors which is unknown.

### Wildfire

- Wildfire hazard areas were determined using the Wildland Fire Susceptibility Index (WFSI).
  - Areas with a WFSI value of 0.01 – 0.05 were considered to be at moderate risk.
  - Areas with a WFSI value greater than 0.05 were considered to be at high risk.
  - Areas with a WFSI value less than 0.01 were considered to not be at risk.
- The WFSI data used for the wildfire risk analysis is a value between 0 and 1. It was developed consistent with the mathematical calculation process for determining the probability of an acre burning. The WFSI integrates the probability of an acre igniting and the expected final fire size based on the rate of spread in four weather percentile categories into a single measure of wildland fire susceptibility. Due to some necessary assumptions, mainly fuel homogeneity, it is not the true probability. But since all areas of the state have this value determined consistently, it allows for comparison and ordination of areas of the state as to the likelihood of an acre burning.

- Building footprints were received from all four participating counties. To refine the results, footprints with an area less than 500 square feet were excluded from the analysis. To determine if a building is in a hazard area, the building footprints were intersected with each of the hazard areas. If a building intersects two or more hazard areas, it is considered to be in the hazard area of highest risk.
- Parcels were received from all four participating counties. This data provided building value and year built. Building value was used to determine the value of buildings at risk.
- Census blocks and Summary File 1 from the 2010 Census were used to determine population at risk. This included the total population, as well as the vulnerable elderly and children age groups. To determine population at risk, the census blocks were intersected with the hazard area. To better determine the actual number of people at risk, the intersecting area of the census block was calculated and divided by the total area of the census block to determine a ratio of area at risk. This ratio was applied to the population of the census block. For example, a census block has a population of 400 people. Five percent of the census block intersects a high wildfire hazard area. The ratio estimates that 20 people are at risk within that hazard area (5% of the total population for that census block).
- There can be multiple buildings on one parcel. However, the parcel only provides one value for building value and year built, and it is not known from the provided data if the building value is cumulative or for the primary structure on the parcel. For the analysis, building value was only counted once per parcel, regardless of the number of structures. This was done to prevent grossly over-estimating the value of buildings at risk. For example, a parcel has three buildings with a value of $300,000. If two of those buildings intersect the high risk area, the assumed building value at risk is $300,000 not $600,000. Even though only two out of three buildings are at risk, there is no way to determine the individual value of each building, so the building value for the whole parcel is counted. The value at risk is also the value of the entire building, and does not take into account the value of contents.

**Winter Weather**

- Winter storm maps are an interpolation of recorded values (historical maximums and 30-year-average) derived from individual point locations.

**Definitions for Descriptors Used for Probability of Future Hazard Occurrences**

- Unlikely: Less than 1% annual probability
- Possible: Between 1 and 10% annual probability
- Likely: Between 10 and 100% annual probability
- Highly Likely: 100% annual probability

## 4.4 Inventory of Community Assets

Each participating jurisdiction assisted in the identification of assets to be used for analysis to determine what assets may be potentially at risk to the hazards covered in the Plan. These assets are defined broadly as anything that is important to the function and character of the community. For the purposes of this *Risk Assessment*, the individual types of assets include:

- Population
- Parcels and Buildings

- Critical Facilities
- Infrastructure
- High Potential Loss Properties
- Historic Properties

Although all assets may be affected by certain hazards (such as hail or tornadoes), some assets are more vulnerable because of their location (e.g., the floodplain), certain physical characteristics (e.g., slab-on-grade construction), or socioeconomic uses (e.g., major employers). The following subsections document the numbers and values used for the *Risk Assessment*.

## 4.4.1 Population

The population counts shown in **Table 4.3** are derived from 2010 census data and include a breakdown of two subpopulations assumed to be at greater risk to natural hazards than the "general" population: elderly (ages 65 and older) and children (under the age of 5). **Figure 4.1** shows population density per square mile, along with the distribution of potentially at-risk populations, across the planning area.

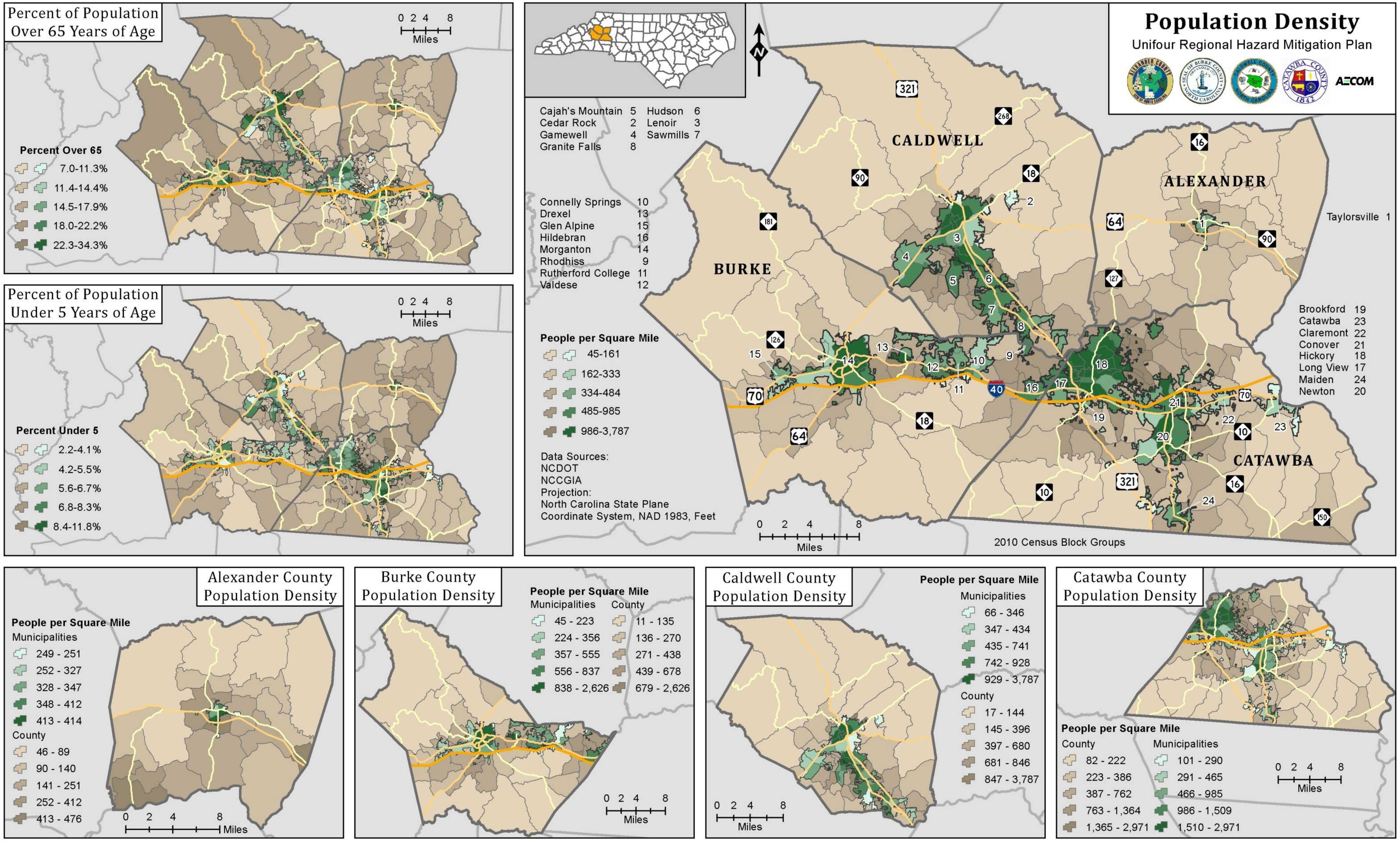
**Table 4.3: Population Counts with Vulnerable Population Breakdown**

| Jurisdiction | 2010 Census Population | Elderly (Age 65 and Over) | Children (Age 5 and Under) |
|---|---|---|---|
| **Alexander County (Unincorporated Area)** | **35,100** | **5,102** | **2,055** |
| Taylorsville | 2,098 | 525 | 154 |
| *Subtotal Alexander* | *37,198* | *5,627* | *2,209* |
| **Burke County (Unincorporated Area)** | **59,578** | **8,865** | **3,085** |
| Connelly Springs | 1,669 | 289 | 86 |
| Drexel | 1,858 | 398 | 94 |
| Glen Alpine | 1,517 | 255 | 104 |
| Hildebran | 2,023 | 398 | 118 |
| Morganton | 16,918 | 3,079 | 1,150 |
| Valdese | 4,490 | 900 | 265 |
| Rutherford College | 1,341 | 234 | 78 |
| *Subtotal Burke* | *90,912* | *14,673* | *5,068* |
| **Caldwell County (Unincorporated Area)** | **43,501** | **6,141** | **2,264** |
| Cajah's Mountain | 2,823 | 519 | 184 |
| Cedar Rock | 300 | 93 | 7 |
| Gamewell | 4,051 | 625 | 215 |
| Granite Falls | 4,722 | 667 | 332 |
| Hudson | 3,776 | 655 | 204 |
| Lenoir | 18,228 | 3,373 | 1,109 |
| Rhodhiss | 1,070 | 149 | 67 |
| Sawmills | 5,240 | 697 | 302 |
| *Subtotal Caldwell* | *83,029* | *12,816* | *4,645* |

| Jurisdiction | 2010 Census Population | Elderly (Age 65 and Over) | Children (Age 5 and Under) |
|---|---|---|---|
| **Catawba County (Unincorporated Area)** | **83,533** | **11,124** | **4,809** |
| Brookford | 382 | 72 | 18 |
| Catawba | 603 | 130 | 27 |
| Claremont | 1,352 | 196 | 77 |
| Conover | 8,165 | 1,389 | 563 |
| Hickory | 40,010 | 5,733 | 2,719 |
| Long View | 4,871 | 770 | 343 |
| Maiden | 3,310 | 456 | 208 |
| Newton | 12,968 | 2,056 | 955 |
| *Subtotal Catawba* | *154,358* | *21,773* | *9,670* |
| **TOTAL UNIFOUR** | **365,497** | **54,889** | **21,592** |

*Source: U.S. Census Bureau.*

**Figure 4.1: Population Density in the Unifour Region**



## 4.4.2 Parcels and Buildings

The parcel counts, building counts, and building values shown in **Table 4.4** represent the built environment inventories used for the analyses included in the *Risk Assessment*. In order to provide a more accurate reflection of buildings that contain livable space and/or commercial, industrial, or other uses, all building footprints less than 500 square feet have been eliminated from the counts and analysis.

**Table 4.4: Parcel and Building Counts and Values by Jurisdiction**

| Jurisdiction | Parcel Count | Building Count | Building Value |
|---|---|---|---|
| **Alexander County (Unincorporated Area)** | **22,700** | **26,193** | **$1,347,565,360** |
| Taylorsville | 1,276 | 1,324 | $135,674,552 |
| *Subtotal Alexander* | *23,976* | *27,517* | *$1,483,239,912* |
| **Burke County (Unincorporated Area)** | **40,817** | **32,482** | **$2,104,478,844** |
| Connelly Springs | 1,238 | 859 | $58,744,312 |
| Drexel | 866 | 766 | $77,219,195 |
| Glen Alpine | 945 | 723 | $58,307,152 |
| Hildebran | 1,069 | 1,056 | $93,714,888 |
| Morganton | 7,818 | 7,265 | $991,355,959 |
| Valdese | 2,806 | 2,071 | $246,727,313 |
| Rutherford College | 796 | 712 | $60,761,106 |
| *Subtotal Burke* | *56,355* | *45,934* | *$3,691,308,769* |
| **Caldwell County (Unincorporated Area)** | **30,345** | **26,119** | **$1,593,124,250** |
| Cajah's Mountain | 1,359 | 1,330 | $112,893,800 |
| Cedar Rock | 230 | 140 | $37,048,600 |
| Gamewell | 1,976 | 2,047 | $125,991,900 |
| Granite Falls | 2,609 | 1,995 | $269,868,250 |
| Hudson | 1,943 | 1,664 | $244,247,500 |
| Lenoir | 10,001 | 8,602 | $1,090,178,404 |
| Rhodhiss | 199 | 482 | $7,519,100 |
| Sawmills | 2,443 | 2,607 | $161,156,400 |
| *Subtotal Caldwell* | *51,530* | *44,986* | *$3,662,721,835* |
| **Catawba County (Unincorporated Area)** | **51,668** | **55,194** | **$4,943,884,600** |
| Brookford | 288 | 295 | $15,166,700 |
| Catawba | 569 | 463 | $50,115,900 |
| Claremont | 964 | 819 | $193,177,000 |
| Conover | 4,383 | 3,945 | $698,896,200 |
| Hickory | 17,953 | 16,241 | $3,249,206,200 |
| Long View | 2,241 | 2,614 | $175,341,400 |
| Maiden | 2,040 | 1,944 | $210,768,400 |
| Newton | 6,473 | 6,358 | $847,798,000 |
| *Subtotal Catawba* | *87,132* | *87,873* | *$10,481,702,043* |
| **TOTAL UNIFOUR** | **218,993** | **206,310** | **$19,318,972,559** |

*Source: Participating jurisdictions.*

### 4.4.3 Critical Facilities

**Table 4.5** shows counts of critical facilities under a variety of categories attributed to each participating jurisdiction.

**Table 4.5: Critical Facilities Counts by Jurisdiction**

| Jurisdiction | Day Care | EMS | EOCs | Fire Stations | Govt. Buildings | Hospitals | Law Enforce-ment | Schools | Senior Care | Shelters |
|---|---|---|---|---|---|---|---|---|---|---|
| **Alexander County (Unincorporated Area)** | **8** | **1** | **0** | **9** | **6** | **0** | **0** | **9** | **3** | **9** |
| Taylorsville | 5 | 1 | 1 | 1 | 15 | 0 | 2 | 2 | 2 | 2 |
| *Subtotal Alexander* | *25* | *2* | *1* | *10* | *21* | *1* | *2* | *10* | *5* | *11* |
| **Burke County (Unincorporated Area)** | **27** | **2** | **0** | **17** | **7** | **0** | **0** | **12** | **6** | **12** |
| Connelly Springs | - | 0 | 0 | 1 | - | 0 | *** | 0 | 0 | 0 |
| Drexel | - | 0 | 0 | 1 | - | 0 | 1 | 1 | 1 | 2 |
| Glen Alpine | - | 1 | 0 | 1 | - | 0 | 1 | 1 | 0 | 1 |
| Hildebran | - | 1 | 0 | 1 | - | 0 | *** | 1 | 1 | 1 |
| Morganton | - | 2 | 1 | 3 | - | 1 | 4 | 11 | 5 | 10 |
| Valdese | 3 | 1 | 0 | 2 | 1 | 1 | 1 | 3 | 1 | 1 |
| Rutherford College | - | 0 | 0 | 2 | - | 1 | *** | 3 | 0 | 1 |
| *Subtotal Burke* | - | *7* | *1* | *27* | - | *2* | *7* | *30* | *14* | *28* |
| **Caldwell County (Unincorporated Area)** | **26** | **1** | **0** | **6** | - | **0** | **0** | **11** | **1** | **12** |
| Cajah's Mountain | 0 | 1 | 0 | 1 | 1 | 0 | 0 | 0 | 1 | 0 |
| Cedar Rock | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Gamewell | 7 | 1 | 0 | 1 | 1 | 0 | 0 | 2 | 0 | 2 |
| Granite Falls | 6 | 1 | 0 | 1 | 1 | 0 | 1 | 2 | 1 | 2 |
| Hudson | 5 | 1 | 0 | 1 | 1 | 0 | 2 | 5 | 0 | 3 |
| Lenoir | 24 | 1 | 2 | 3 | 11 | 1 | 2 | 6 | 7 | 7 |
| Rhodhiss | 0 | 0 | 0 | 2 | 0 | 0 | 1 | 0 | 0 | 0 |
| Sawmills | 6 | 0 | 0 | 1 | 1 | 0 | 0 | 1 | 0 | 2 |

| Jurisdiction | Day Care | EMS | EOCs | Fire Stations | Govt. Buildings | Hospitals | Law Enforce-ment | Schools | Senior Care | Shelters |
|---|---|---|---|---|---|---|---|---|---|---|
| *Subtotal Caldwell* | *74* | *6* | *2* | *15* | *16* | *1* | *6* | *27* | *10* | *28* |
| **Catawba County (Unincorporated Area)** | **54** | **4** | **0** | **17** | **1** | **0** | **1** | **18** | **1** | **19** |
| Brookford | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 |
| Catawba | 3 | 1 | 0 | 1 | 1 | 0 | 1 | 1 | 0 | 1 |
| Claremont | 4 | 0 | 0 | 1 | 1 | 0 | 1 | 1 | 0 | 2 |
| Conover | 12 | 0 | 0 | 3 | 1 | 0 | 1 | 1 | 4 | 1 |
| Hickory | 39 | 1 | 1 | 7 | 1 | 2 | 1 | 9 | 8 | 12 |
| Long View | 5 | 0 | 0 | 1 | 1 | 0 | 1 | 2 | 0 | 2 |
| Maiden | 5 | 0 | 0 | 2 | 1 | 0 | 1 | 3 | 0 | 2 |
| Newton | 17 | 1 | 1 | 3 | 1 | 0 | 2 | 5 | 3 | 6 |
| *Subtotal Catawba* | *139* | *7* | *1* | *31* | *9* | *2* | *9* | *40* | *16* | *45* |
| **TOTAL UNIFOUR** | **238** | **22** | **5** | **85** | **46** | **6** | **26** | **107** | **45** | **112** |

*Source: Numbers in black supplied by participating jurisdictions. Numbers in orange derived from alternate sources via NC OneMap.*
**** A facility exists but a GPS point location for GIS analysis is not currently available.*

**Figures 4.2** through **4.5** show the general locations of critical facilities across the planning area by county.

**Figure 4.2: Critical Facilities Locations in Alexander County**

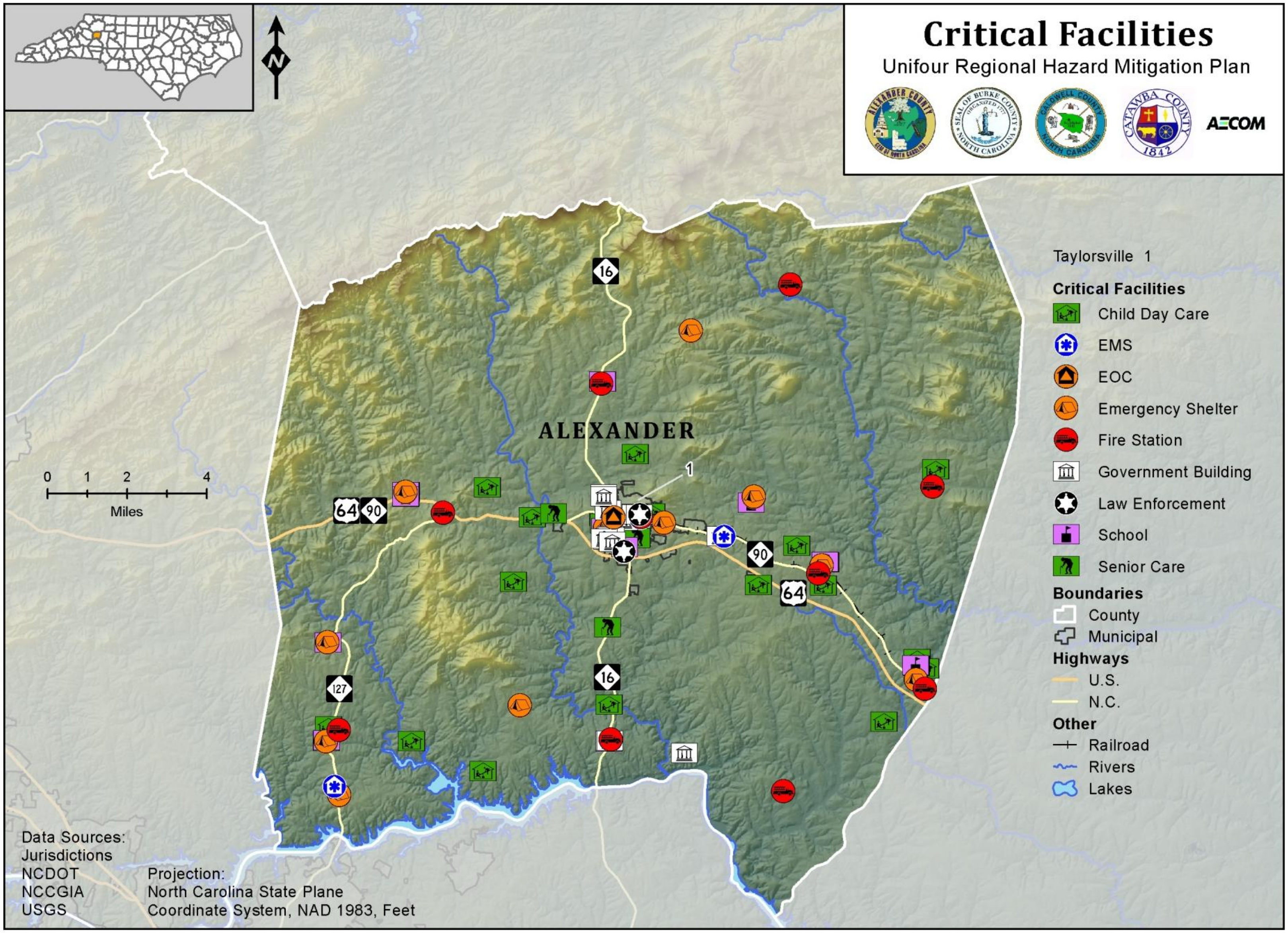


**Figure 4.3: Critical Facilities Locations in Burke County**

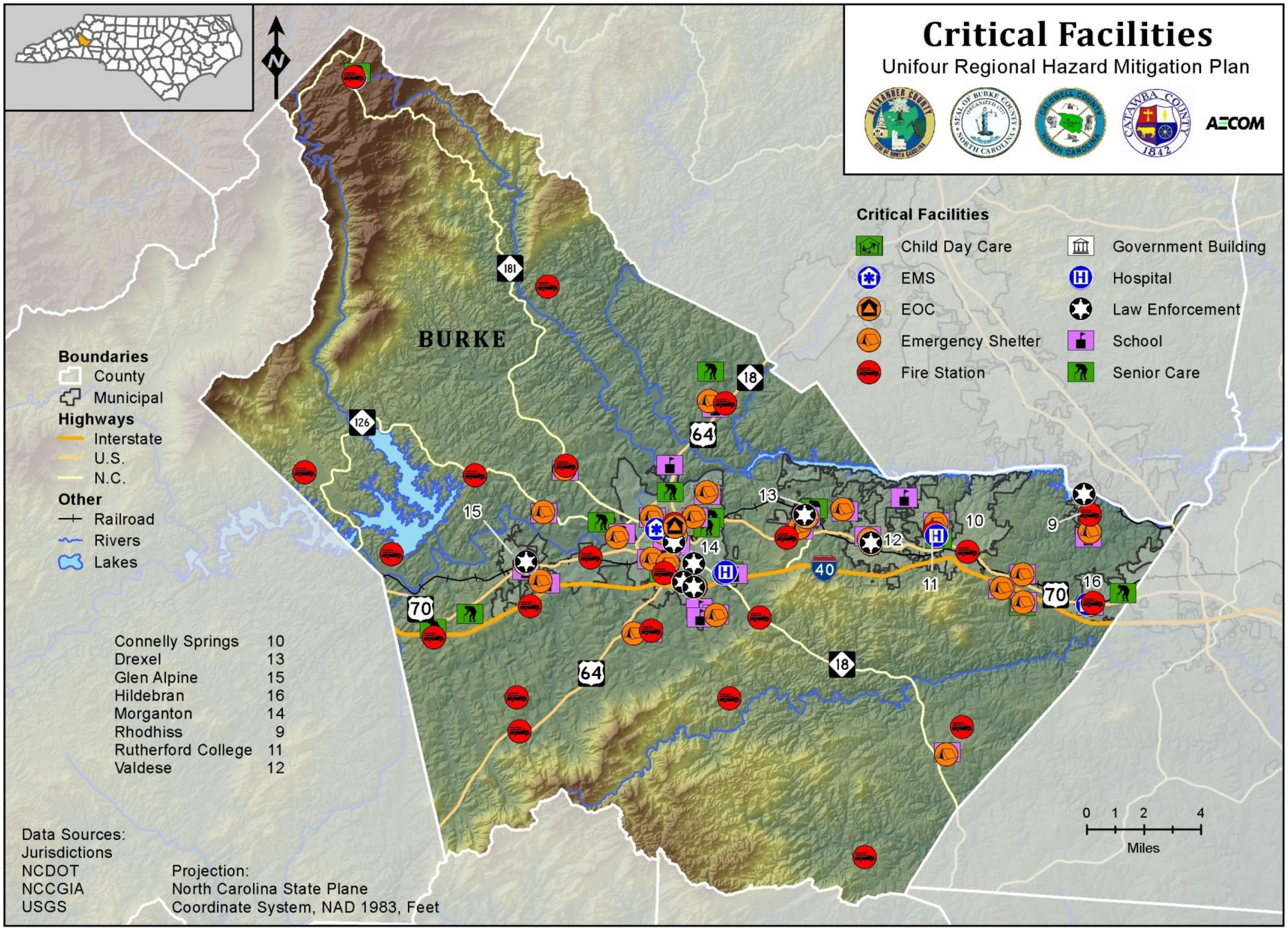


Figure 4.4: Critical Facilities Locations in Caldwell County

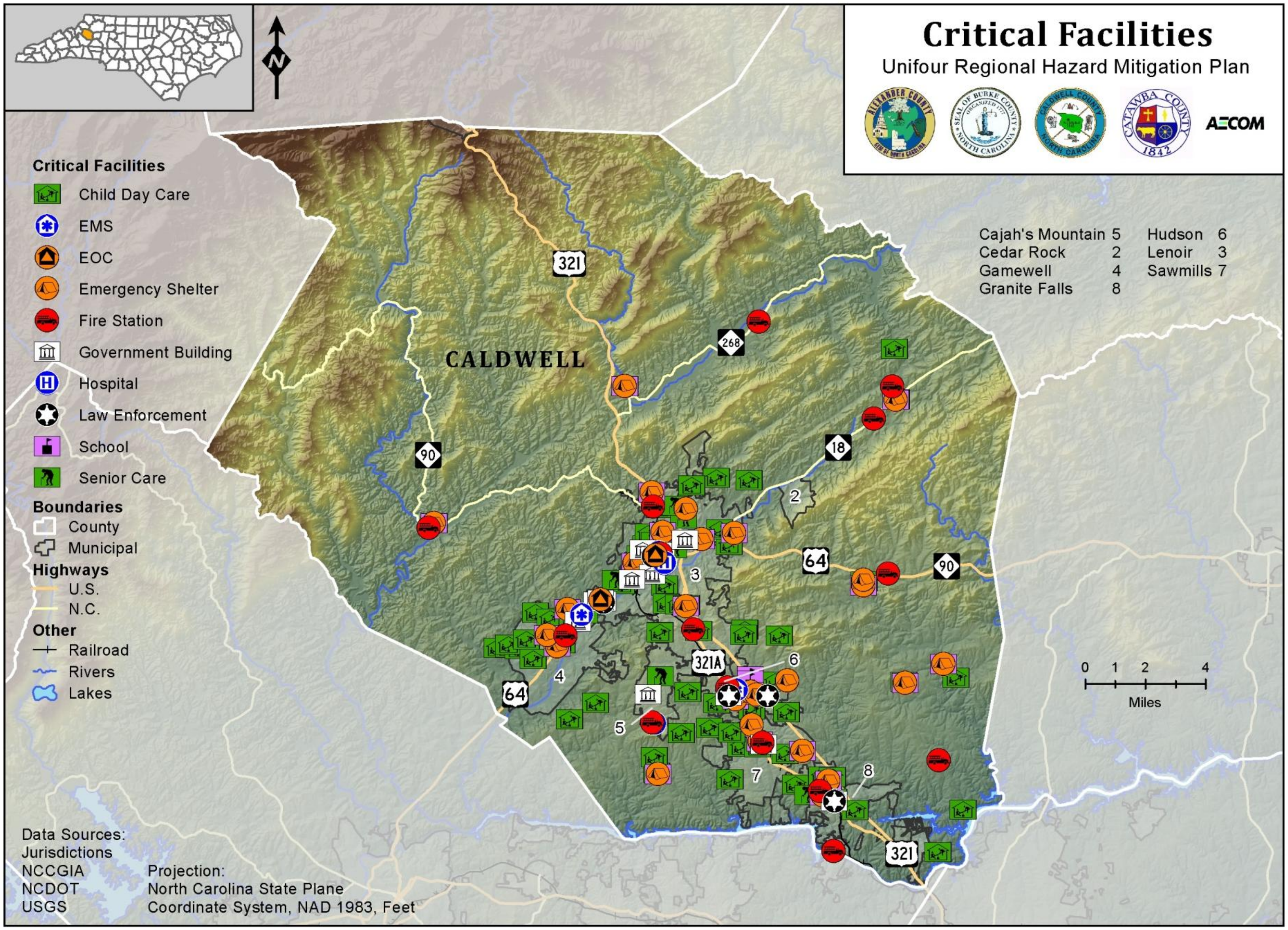
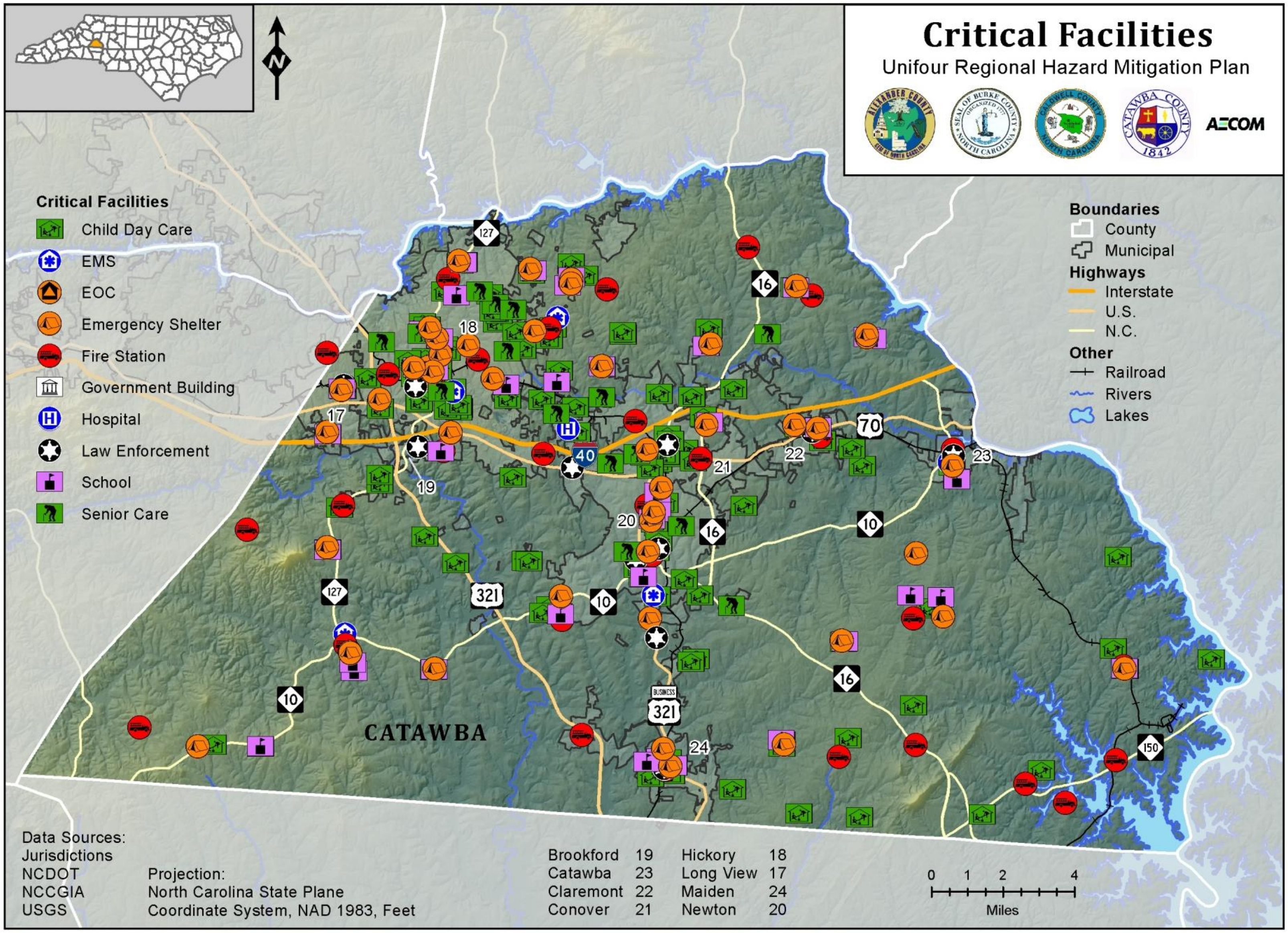


**Figure 4.5: Critical Facilities Locations in Catawba County**



## 4.4.4 Infrastructure

Certain infrastructure elements as shown in **Table 4.6** were identified for analysis. These include major roads[3], railroads, power plants, water/wastewater facilities, and water/wastewater lines.

**Table 4.6: Infrastructure Counts and Measurements (in Miles) by Jurisdiction**

| Jurisdiction | Major Roads | Railroad[4] | Power Plants | Water/Wastewater Facilities[5] | Water/Wastewater Lines |
|---|---|---|---|---|---|
| **Alexander County (Unincorporated Area)** | **51.8** | **8.0** | **0** | **0** | **384.6** |
| Taylorsville | 4.3 | 1.7 | 0 | 1 | 43.5 |
| *Subtotal Alexander* | *56.1* | *9.7* | *0* | *2* | *428.1* |
| **Burke County (Unincorporated Area)** | **139.5** | **18.0** | **1** | **1** | **362.8** |
| Connelly Springs | 2.1 | 1.8 | 0 | 0 | 8.2 |
| Drexel | 0.6 | 1.0 | 0 | 0 | 30.2 |
| Glen Alpine | 1.2 | 1.3 | 0 | 0 | 15.6 |
| Hildebran | 1.9 | 1.9 | 0 | 0 | 34.6 |
| Morganton | 31.4 | 7.7 | 0 | 2 | 307.2 |
| Valdese | 2.5 | 0.6 | 0 | 2 | 103.2 |
| Rutherford College | 3.2 | 2.5 | 0 | 0 | 21.1 |
| *Subtotal Burke* | *182.4* | *34.8* | *1* | *5* | *882.9* |
| **Caldwell County (Unincorporated Area)** | **95.8** | **1.5** | **1** | **2** | **317.6** |
| Cajah's Mountain | 0.0 | 0.0 | 0 | 0 | 31.1 |
| Cedar Rock | 0.0 | 0.0 | 0 | 0 | 6.3 |
| Gamewell | 3.2 | 0.0 | 0 | 0 | 9.8 |
| Granite Falls | 6.1 | 3.2 | 0 | 1 | 96.2 |
| Hudson | 7.5 | 2.5 | 0 | 0 | 72.9 |
| Lenoir | 21.2 | 12.1 | 0 | 3 | 337.1 |
| Rhodhiss | 0.0 | 0.6 | 0 | 1 | 8.6 |
| Sawmills | 4.4 | 2.4 | 0 | 0 | 20.1 |
| *Subtotal Caldwell* | *138.2* | *22.3* | *1* | *7* | *891.3* |
| **Catawba County (Unincorporated Area)** | **119.2** | **41.3** | **2** | **-** | **-** |
| Brookford | 1.6 | 0.0 | 0 | - | - |
| Catawba | 2.3 | 5.1 | 0 | - | - |
| Claremont | 2.6 | 3.9 | 0 | - | - |
| Conover | 17.8 | 9.1 | 0 | - | - |
| Hickory | 32.2 | 11.7 | 0 | 4 | 1,417 |

[3] The major roads and railroads accounted for in this table are the same as those depicted on the "Community Profile" map found in Section 2.

[4] Does not include inactive/abandoned railroads.

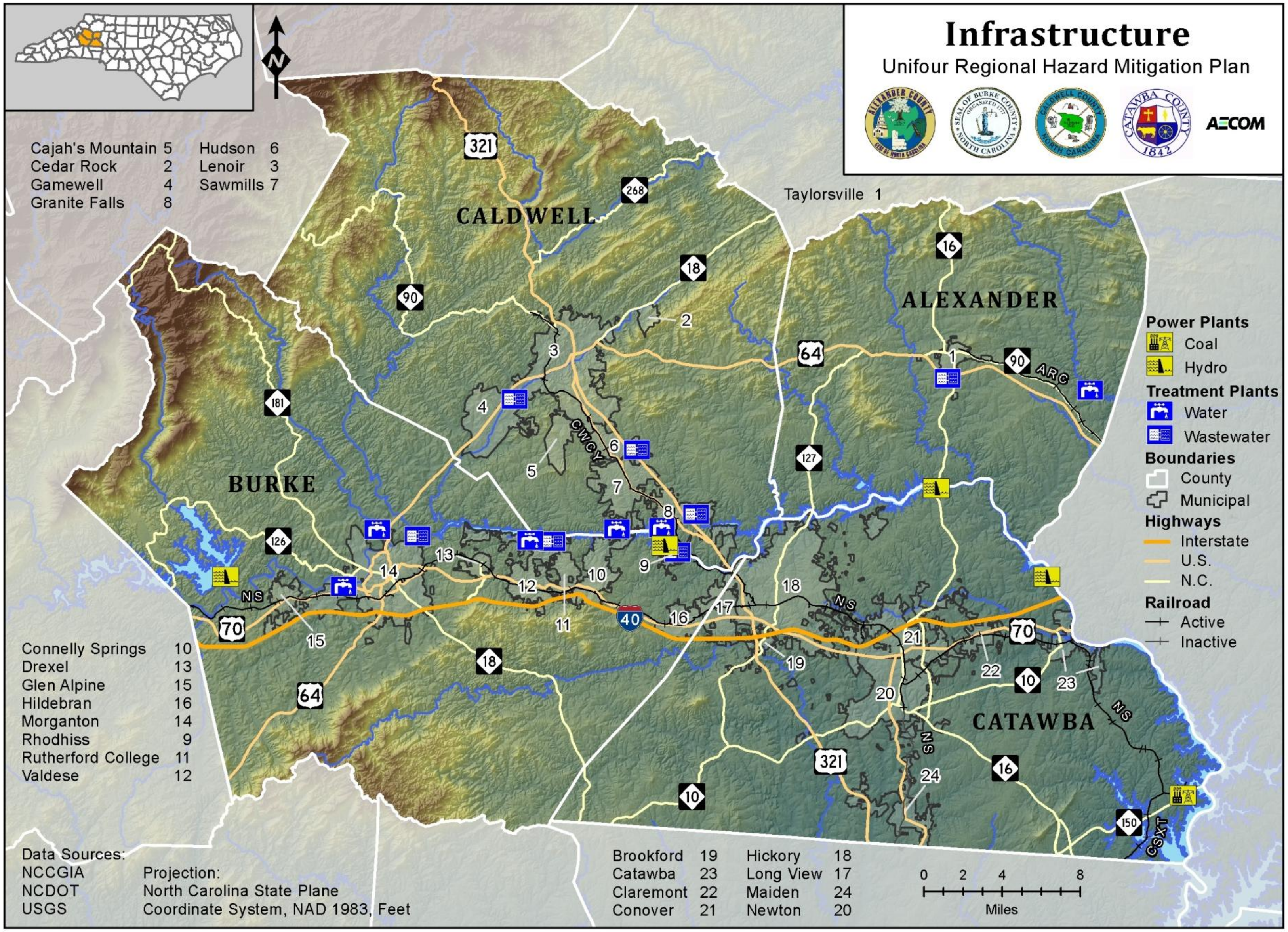
[5] Water and wastewater facilities and lines data were not made publicly available for Catawba County for the purposes of the Plan, including most of the incorporated municipalities within the county.

| Jurisdiction | Major Roads | Railroad[4] | Power Plants | Water/Wastewater Facilities[5] | Water/Wastewater Lines |
|---|---|---|---|---|---|
| Long View | 5.0 | 2.2 | 0 | - | 11.1 |
| Maiden | 6.0 | 0.0 | 0 | - | - |
| Newton | 14.6 | 4.9 | 0 | - | - |
| *Subtotal Catawba* | *201.3* | *78.2* | *2* | - | - |
| **TOTAL UNIFOUR** | **578.0** | **141.8** | **4** | **-** | **-** |

*Source: NCDOT, USGS, participating jurisdictions.*

**Figure 4.6** shows the general locations of infrastructure elements across the planning area.

**Figure 4.6: Infrastructure Locations**



## 4.4.5 High Potential Loss Properties

**Table 4.7** shows counts of high potential loss properties attributed to each participating jurisdiction. **Figure 4.7** shows the general locations of these properties across the planning area.

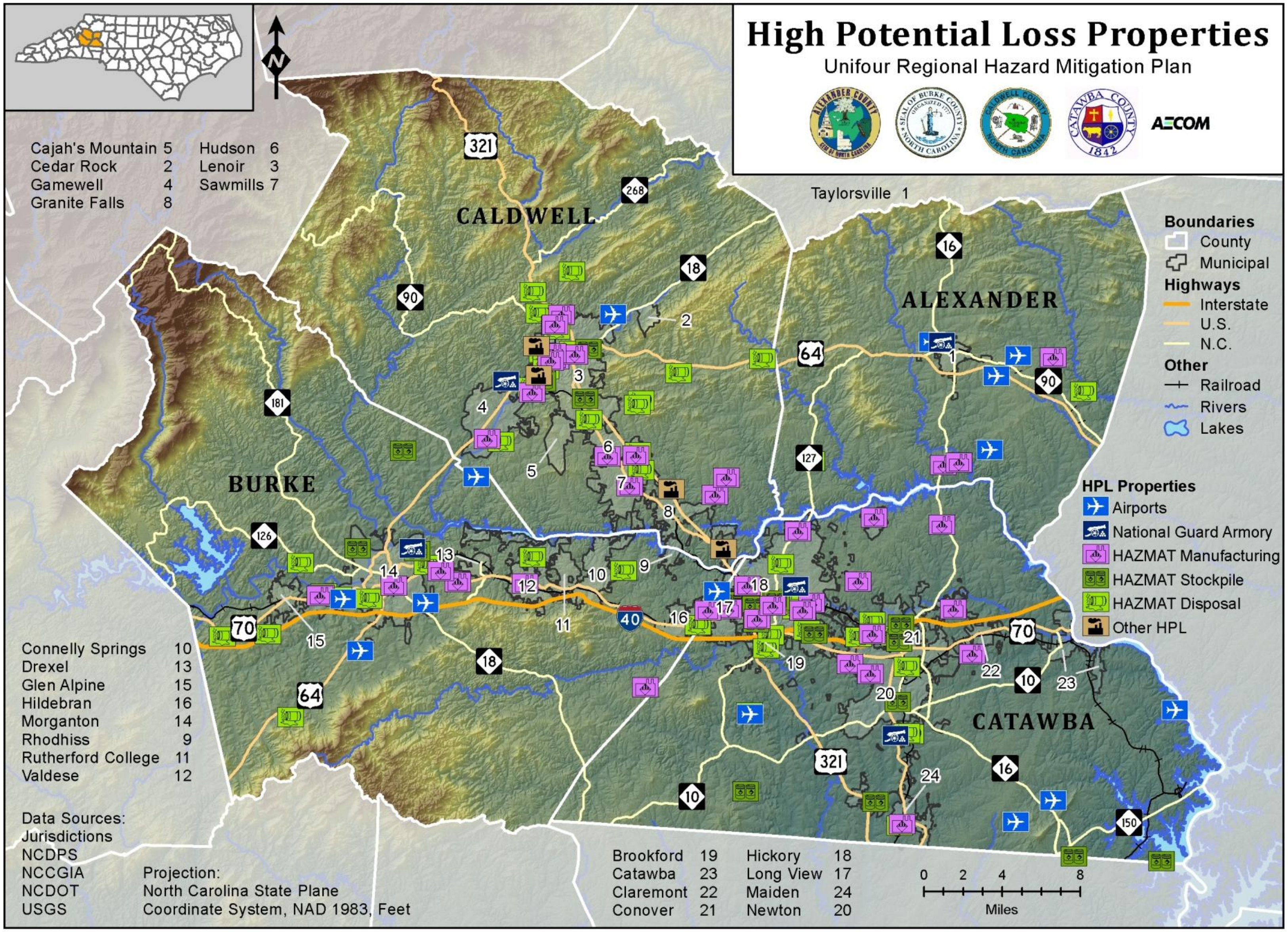
**Table 4.7: High Potential Loss Properties by Jurisdiction**

| Jurisdiction | Airports | Dams[6] | Military Facilities | Hazardous Materials Sites | Other[7] |
|---|---|---|---|---|---|
| **Alexander County (Unincorporated Area)** | **4** | **42** | **1** | **6** | **-** |
| Taylorsville | 0 | 1 | 0 | 0 | - |
| *Subtotal Alexander* | *4* | *43* | *1* | *6* | - |
| **Burke County (Unincorporated Area)** | **2** | **37** | **0** | **9** | **-** |
| Connelly Springs | 0 | 0 | 0 | 0 | - |
| Drexel | 0 | 0 | 0 | 0 | - |
| Glen Alpine | 0 | 0 | 0 | 0 | - |
| Hildebran | 0 | 0 | 0 | 1 | - |
| Morganton | 1 | 6 | 1 | 10 | - |
| Valdese | 0 | 0 | 0 | 2 | - |
| Rutherford College | 0 | 0 | 0 | 0 | - |
| *Subtotal Burke* | *3* | *43* | *1* | *22* | - |
| **Caldwell County (Unincorporated Area)** | **2** | **32** | **0** | **7** | **-** |
| Cajah's Mountain | 0 | 0 | 0 | 0 | - |
| Cedar Rock | 0 | 0 | 0 | 0 | - |
| Gamewell | 0 | 2 | 0 | 2 | - |
| Granite Falls | 0 | 1 | 0 | 0 | 1 |
| Hudson | 0 | 0 | 0 | 3 | - |
| Lenoir | 0 | 4 | 1 | 24 | 2 |
| Rhodhiss | 0 | 0 | 0 | 0 | - |
| Sawmills | 0 | 1 | 0 | 2 | - |
| *Subtotal Caldwell* | *2* | *40* | *1* | *38* | *3* |
| **Catawba County (Unincorporated Area)** | **4** | **74** | **0** | **5** | **-** |
| Brookford | 0 | 1 | 0 | 2 | - |
| Catawba | 0 | 2 | 0 | 0 | - |
| Claremont | 0 | 0 | 0 | 1 | - |
| Conover | 0 | 1 | 0 | 8 | - |
| Hickory | 1 | 5 | 1 | 23 | 1 |
| Long View | 0 | 0 | 0 | 3 | - |
| Maiden | 0 | 2 | 0 | 3 | - |
| Newton | 0 | 2 | 1 | 5 | - |
| *Subtotal Catawba* | *5* | *87* | *2* | *50* | *1* |
| **TOTAL UNIFOUR** | **14** | **213** | **5** | **116** | **4** |

*Source: Local sources and NCGIA.*

[6] Locations of dams are provided in the dam failure section and are not shown on the following map.
[7] This category consists of a variety of facilities specified by participating jurisdictions.

**Figure 4.7: Locations of High Potential Loss Properties**



## 4.4.6 Historic Properties

Historic property counts including districts, buildings, and other cultural resources as shown in **Table 4.8** were derived from a combination of sources consisting of the National Register of Historic Places (National Park Service) and participating jurisdictions.

**Table 4.8: Historic Property Counts by Jurisdiction**

| Jurisdiction | Districts | Buildings | Other |
|---|---|---|---|
| **Alexander County (Unincorporated Area)** | **0** | **1** | **0** |
| Taylorsville | 0 | 0 | 0 |
| *Subtotal Alexander* | *0* | *1* | *0* |
| **Burke County (Unincorporated Area)** | **0** | **8** | **1** |
| Connelly Springs | 0 | 0 | 0 |
| Drexel | 0 | 0 | 0 |
| Glen Alpine | 0 | 0 | 0 |
| Hildebran | 0 | 0 | 0 |
| Morganton | 9 | 25 | 1 |
| Valdese | 0 | 2 | 0 |
| Rutherford College | 0 | 0 | 0 |
| *Subtotal Burke* | *9* | *35* | *2* |
| **Caldwell County (Unincorporated Area)** | **2** | **7** | **0** |
| Cajah's Mountain | 0 | 0 | 0 |
| Cedar Rock | 0 | 0 | 0 |
| Gamewell | 0 | 0 | 0 |
| Granite Falls | 0 | 1 | 0 |
| Hudson | 0 | 0 | 0 |
| Lenoir | 1 | 44 | 0 |
| Rhodhiss | 0 | 0 | 0 |
| Sawmills | 0 | 0 | 0 |
| *Subtotal Caldwell* | *3* | *52* | *0* |
| **Catawba County (Unincorporated Area)** | **6** | **21** | **1** |
| Brookford | 0 | 0 | 0 |
| Catawba | 1 | 0 | 0 |
| Claremont | 0 | 0 | 0 |
| Conover | 1 | 1 | 1 |
| Hickory | 7* | 467** | 0 |
| Long View | 0 | 1 | 0 |
| Maiden | 0 | 2 | 0 |
| Newton | 3 | 7 | 0 |
| *Subtotal Catawba* | *18* | *499* | *2* |
| **TOTAL UNIFOUR** | **30** | **587** | **4** |

*Source: Jurisdictions and National Register of Historic Places.*
**GIS data is only currently available for 5 of the 7 districts in the City of Hickory.*
***GIS data is only available for 15 of the 320 nationally recognized structures and the 147 locally recognized structures (467 total) in the City of Hickory. Many of these buildings are assumed to be within the 7 districts.*

## 4.5 Hazard Profiles, Analysis, and Vulnerability

As stated in subsection 4.2, the following hazards are addressed in this *Risk Assessment* and are presented in the following order in the subsections to follow:

**Hydrologic Hazards (Water Hazards)**
- Flood
- Erosion
- Dam/Levee Failure
- Drought/Extreme Heat

**Atmospheric Hazards (Severe Storms)**
- Thunderstorm, Lightning, and Hail
- Tornado
- Winter Weather
- Hurricane and Tropical Storm

**Geologic Hazards**
- Landslide
- Earthquake
- Sinkhole

**Other Hazards**
- Wildfire

### 4.5.1 Hydrologic Hazards (Water Hazards)

Hydrologic hazards are essentially "water-based" hazards that include flood, erosion, dam/levee failure, and drought/extreme heat. It is important to note that some hydrologic hazards result from the activity of atmospheric hazards, such as thunderstorms producing large amounts of rain, etc.

#### 4.5.1.1 Flood

**Flood Hazard Description**

Flooding is the most frequent and costly natural hazard in the United States, a hazard that has caused more than 10,000 deaths since 1900. Nearly 90% of presidential disaster declarations result from natural events where flooding was a major component.

Riverine flooding is generally the result of excessive precipitation. The severity of a flooding event is typically determined by a combination of several major factors, including: stream and river basin topography and physiography; precipitation and weather patterns; recent soil moisture conditions; and the degree of vegetative clearing and impervious surface. Riverine floods can be long-term events that may last for several days.

Most flash flooding is caused by slow-moving thunderstorms in a local area or by heavy rains associated with hurricanes and tropical storms. However, flash flooding events may also occur from a dam or levee failure within minutes or hours of heavy amounts of rainfall, or from a sudden release of water held by a retention basin or other stormwater control facility. Although flash flooding occurs most often along mountain streams, it is also common in urbanized areas where much of the ground is covered by impervious surfaces.

The periodic flooding of lands adjacent to rivers, streams, and shorelines (land known as floodplain) is a natural and inevitable occurrence that can be expected to take place based upon established recurrence intervals. The recurrence interval of a flood is defined as the average time interval, in years, expected between a flood event of a particular magnitude and an equal or larger flood. Flood magnitude increases with increasing recurrence intervals, and floodplains are designated by the frequency of the flood that is large enough to cover them. For example, the 10-year floodplain will be inundated by the 10-year flood and the 100-year floodplain by the 100-year flood. Another way of expressing the flood frequency is the chance of occurrence in a given year, which is the percentage of the probability of flooding each year. For example, the 100-year flood has a 1-percent-annual-chance of occurring in any given year. The 500-year flood has a 0.2-percent-annual-chance of occurring in any given year.

## Flood Hazard Analysis

There are numerous rivers and streams flowing through the planning area. When heavy or prolonged rainfall events occur, these rivers and streams are susceptible to some degree of flooding. There have been a number of past flooding events throughout the planning area, ranging widely in terms of location, magnitude, and impact. The most frequent flooding events have been localized in nature, resulting from heavy rains in a short period of time over urbanized areas that are not able to adequately handle stormwater runoff. These events typically do not threaten lives or property and do not result in emergency or disaster declarations, therefore historical data is limited to the larger, most notable events.

### *Location Within the Planning Area*

**Figures 4.8** through **4.36** show the boundaries of the floodway, 1-percent-annual-chance and 0.2-percent-annual-chance floods, based on effective DFIRM data as of August 2013. These are the three mapped flood hazard areas used as the basis for this analysis.

### *Extent (Magnitude and Severity)*

This regional hazard analysis focuses on the three flood hazard extents shown in Figures 4.8 through 4.36: the floodway, the 1-percent-annual-chance flood (100-year return period) and the 0.2-percent-annual-chance flood (500-year return period).

### *Historical Occurrences*

The following historical occurrences ranging from 1993 to the present have been identified based on the National Climatic Data Center (NCDC) Storm Events database (**Table 4.9**). It should be noted that only those historical occurrences listed in the NCDC database are shown here and that other, unrecorded or unreported events may have occurred within the planning area during this timeframe.

**Figure 4.8: Flood Hazard Areas in the Unifour Region**

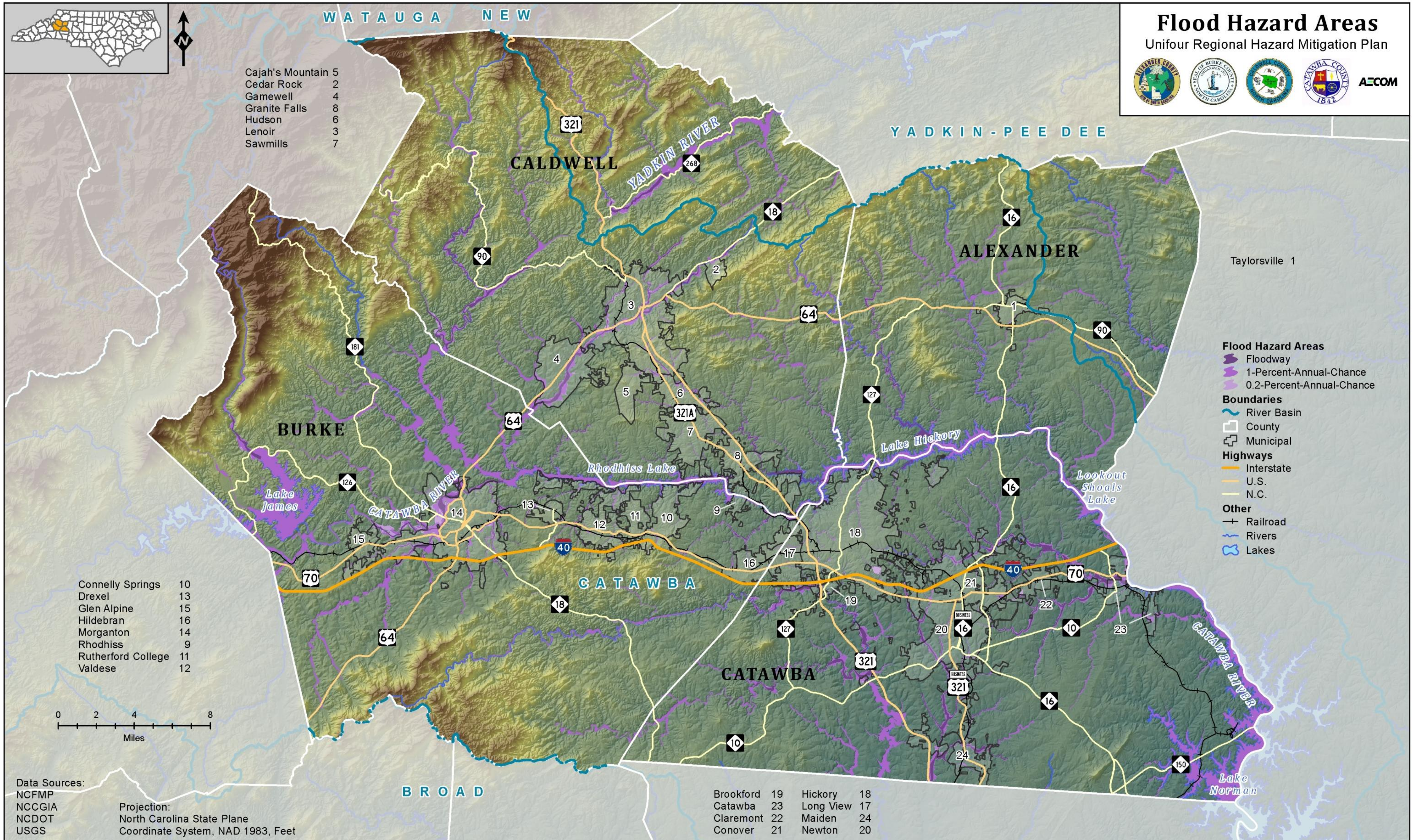


**Figure 4.9: Flood Hazard Areas in Alexander County**

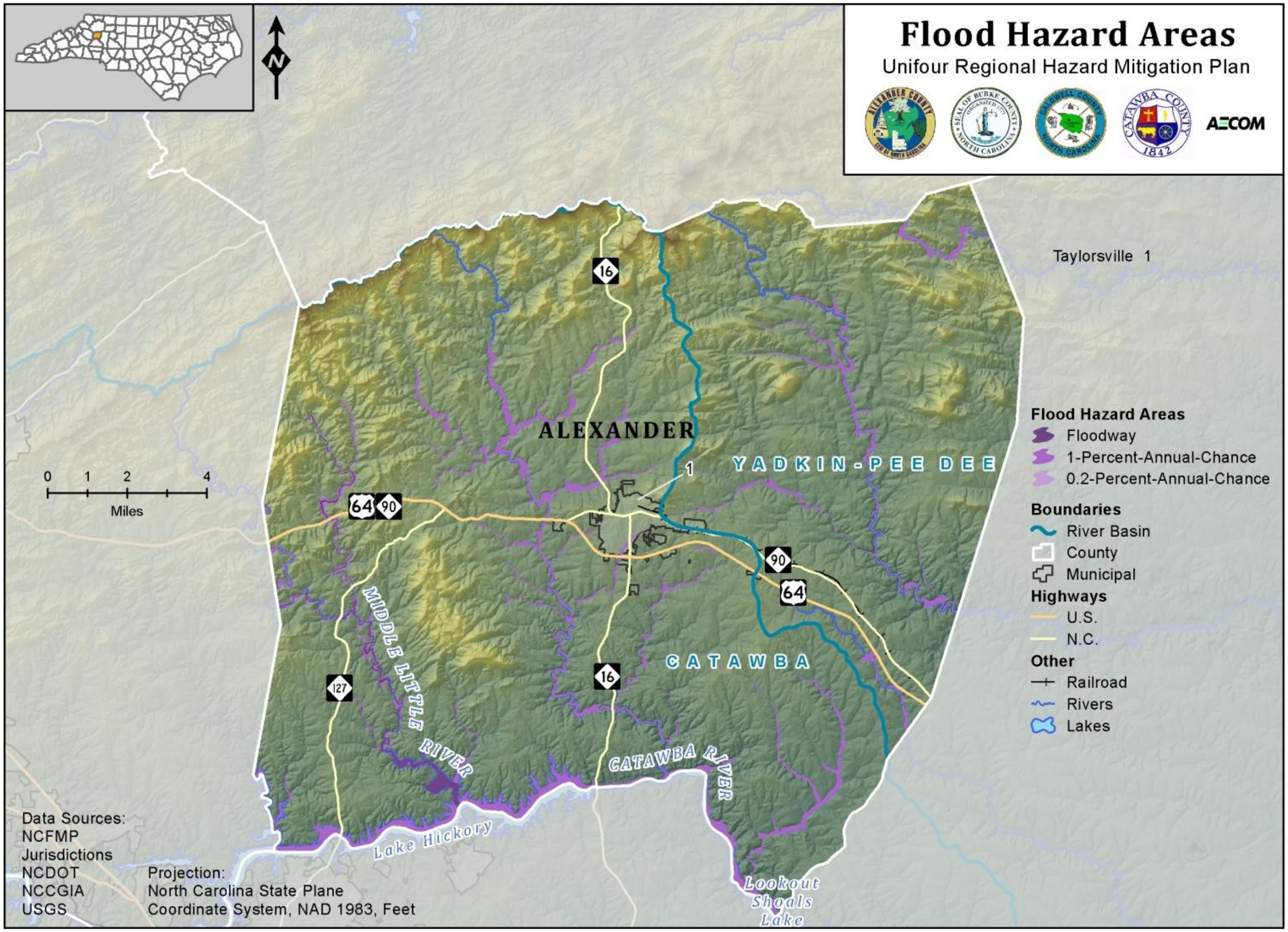


**Figure 4.10: Flood Hazard Areas in the Town of Taylorsville**

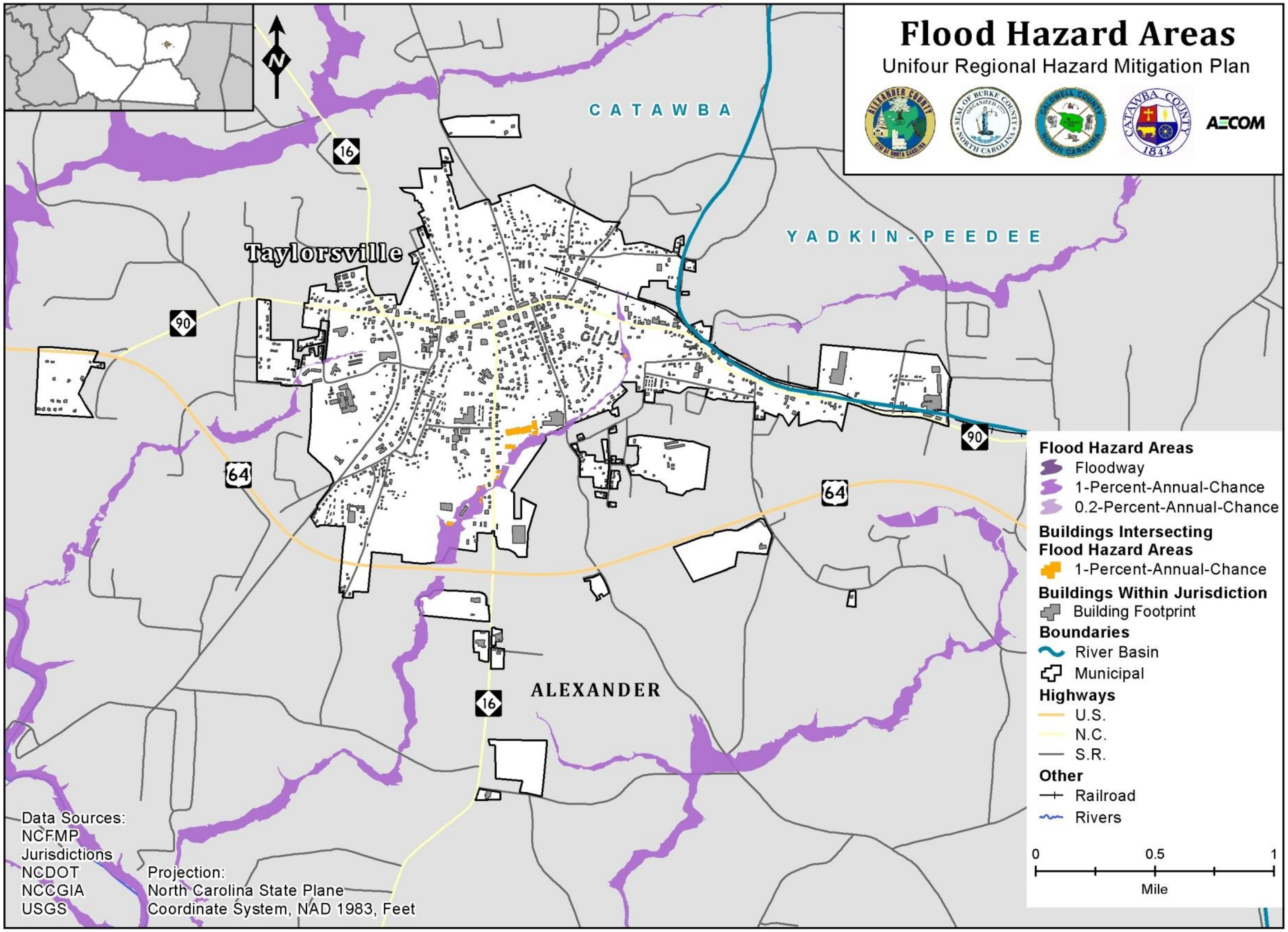


**Figure 4.11: Flood Hazard Areas in Burke County**

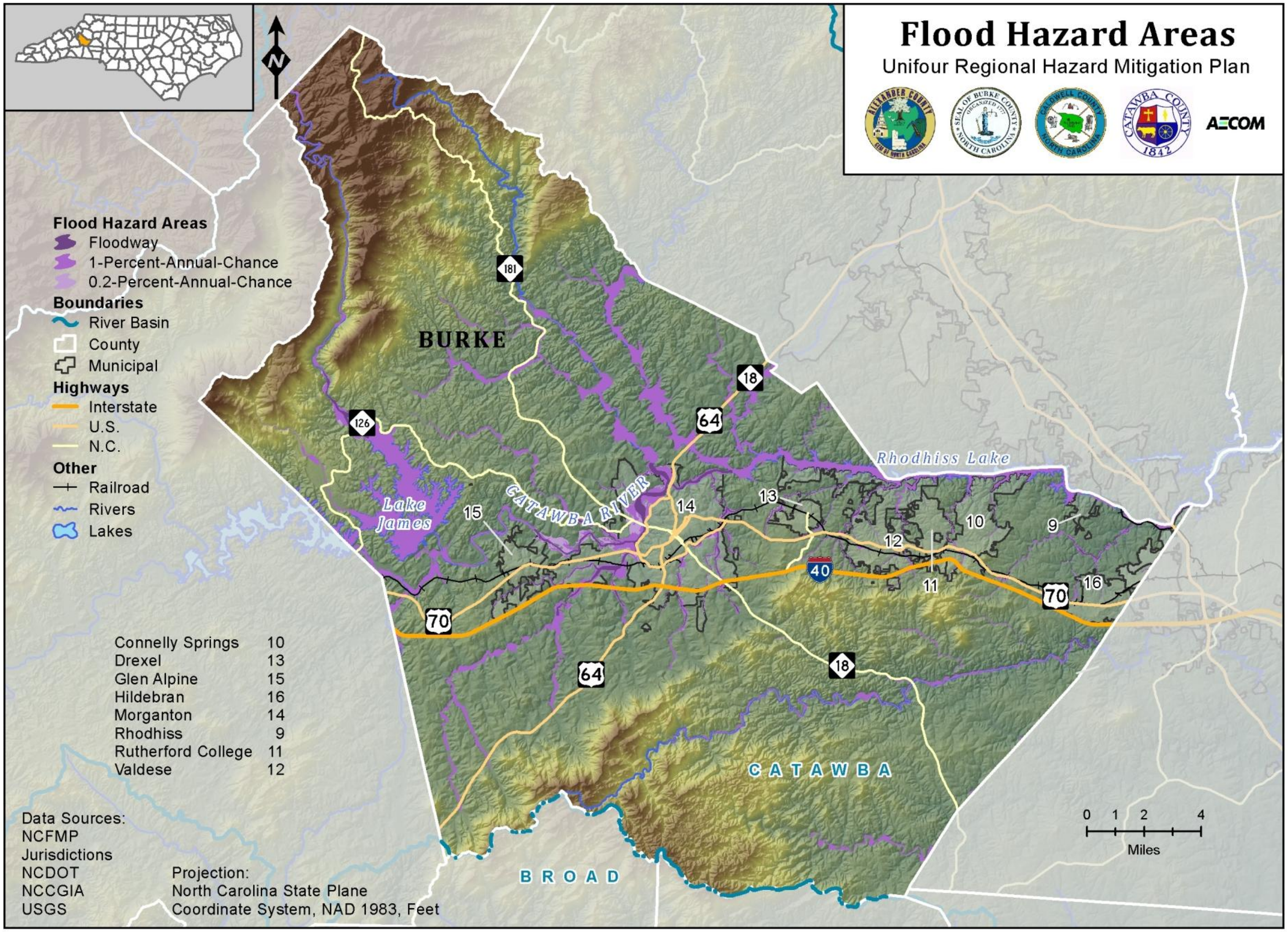


**Figure 4.12: Flood Hazard Areas in the Town of Connelly Springs**

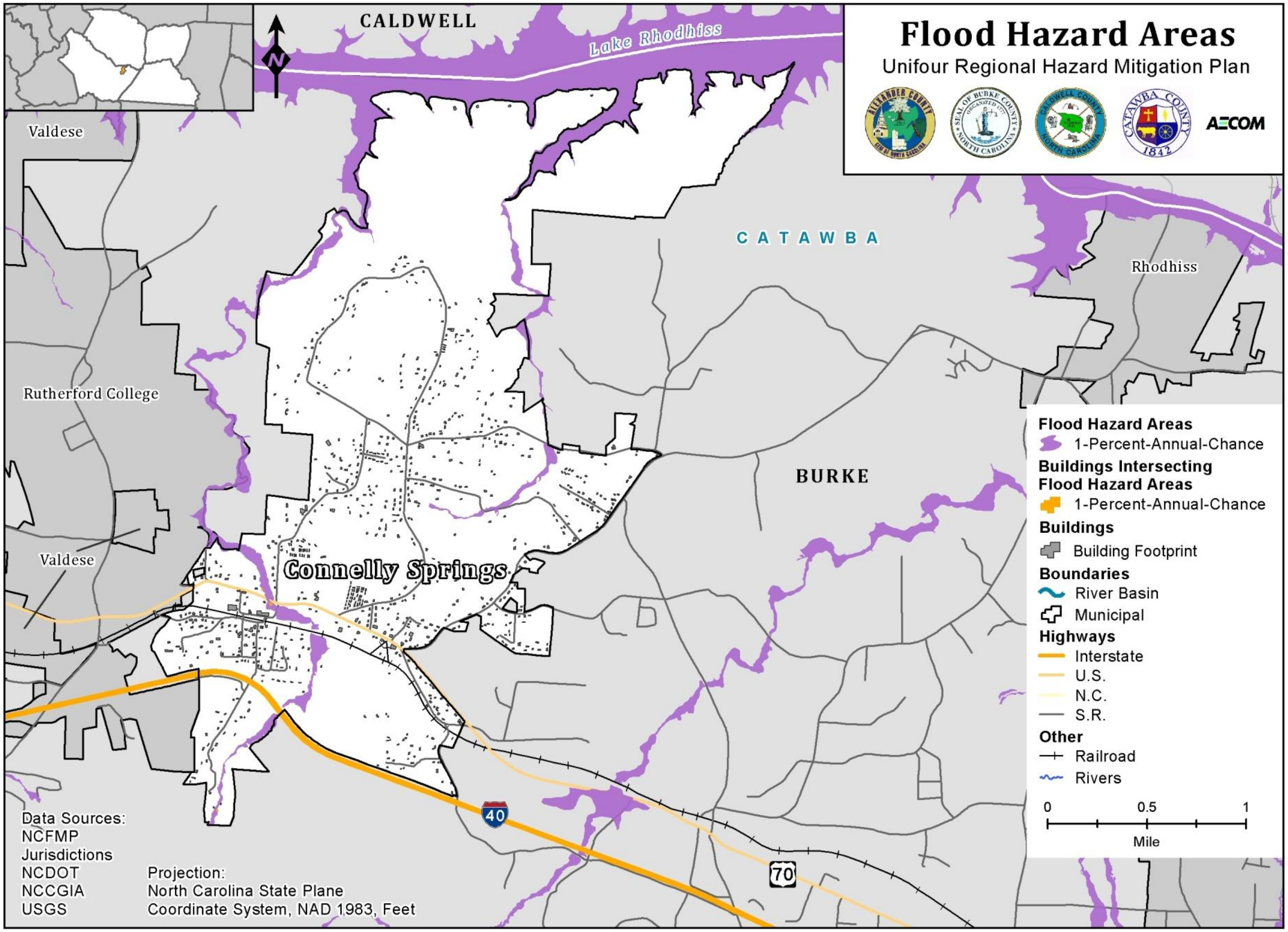


**Figure 4.13: Flood Hazard Areas in the Town of Drexel**

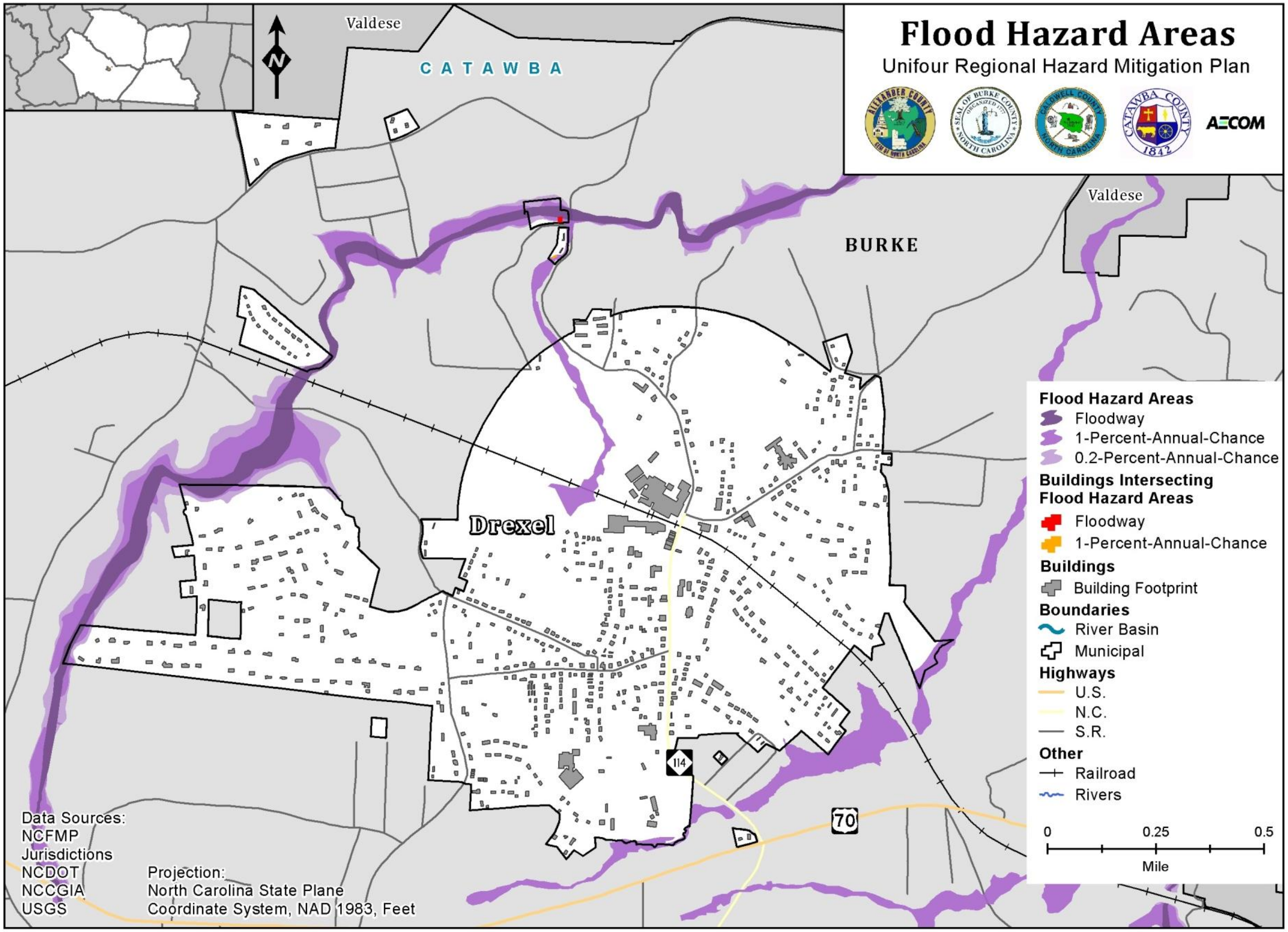


**Figure 4.14: Flood Hazard Areas in the Town of Glen Alpine**

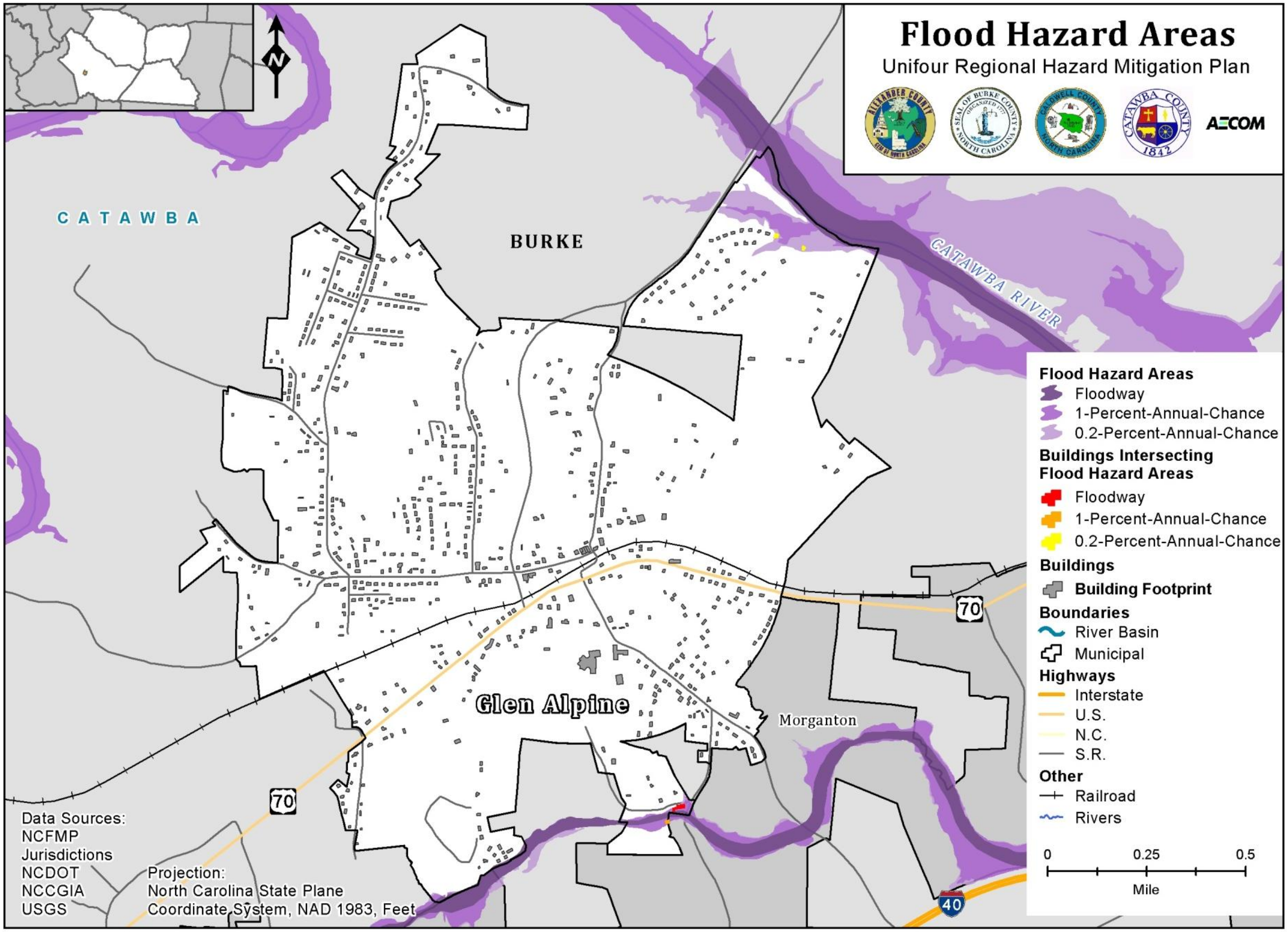


**Figure 4.15: Flood Hazard Areas in the Town of Hildebran**

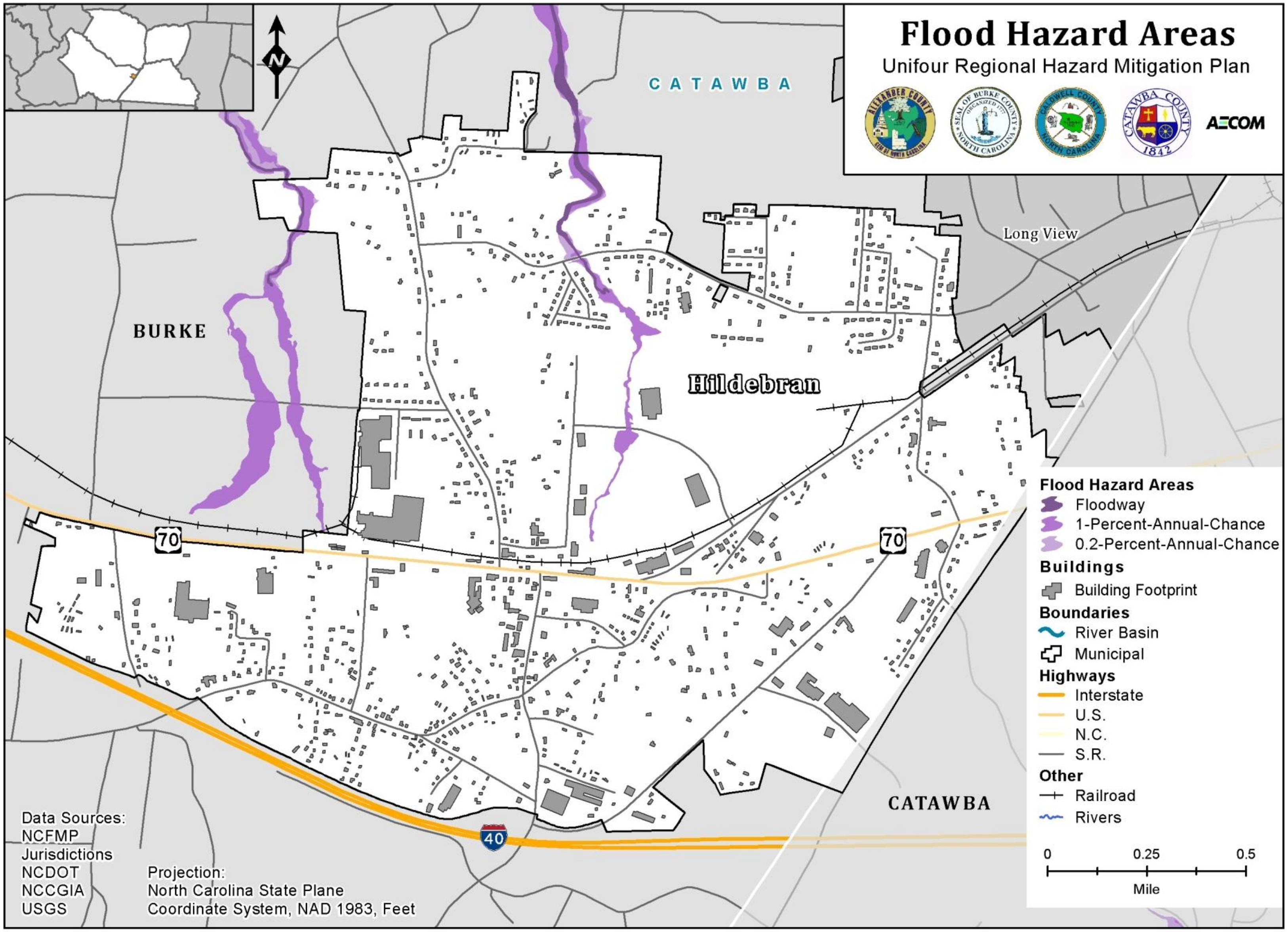


**Figure 4.16: Flood Hazard Areas in the City of Morganton**

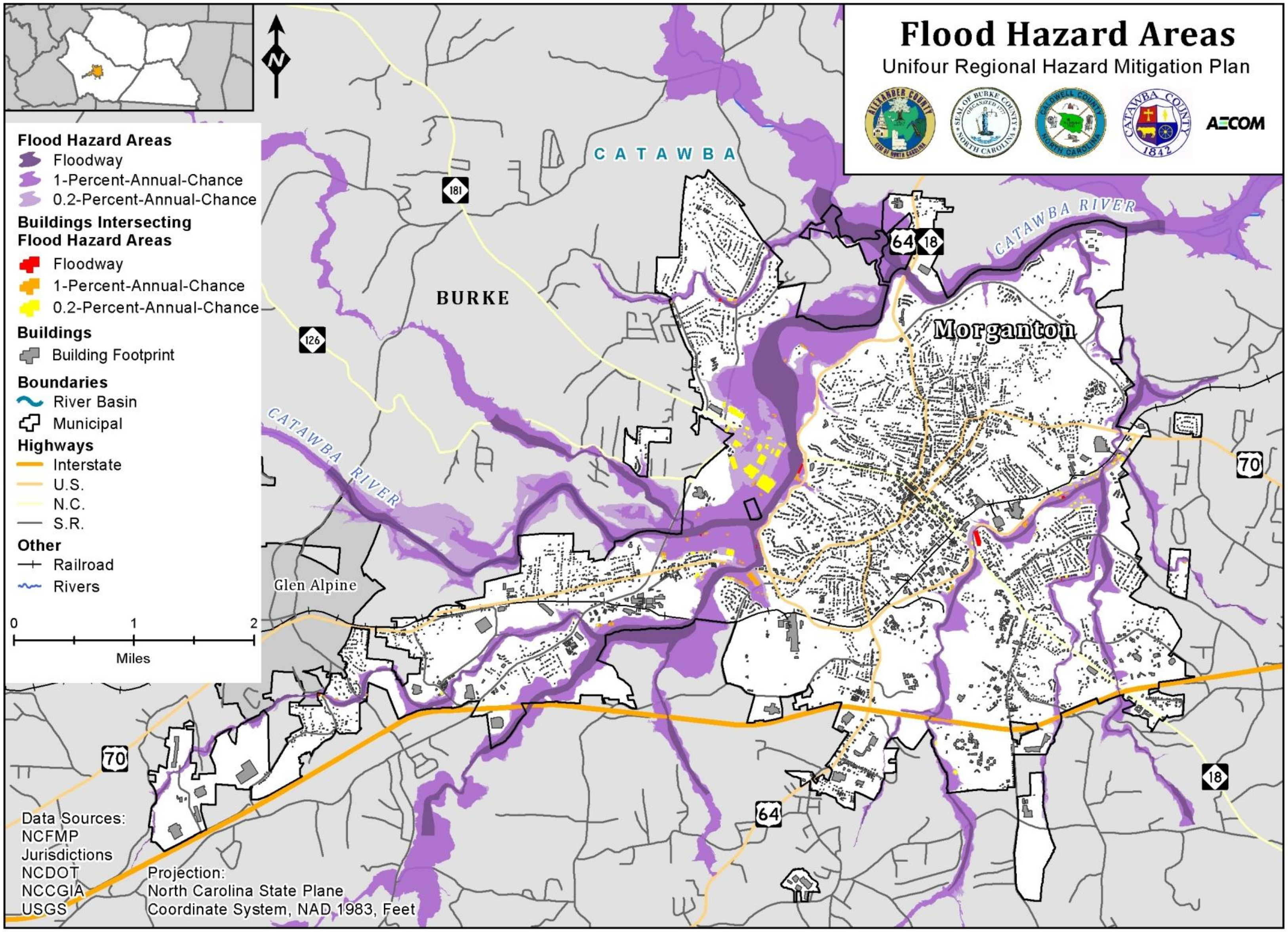


**Figure 4.17: Flood Hazard Areas in the Town of Valdese**

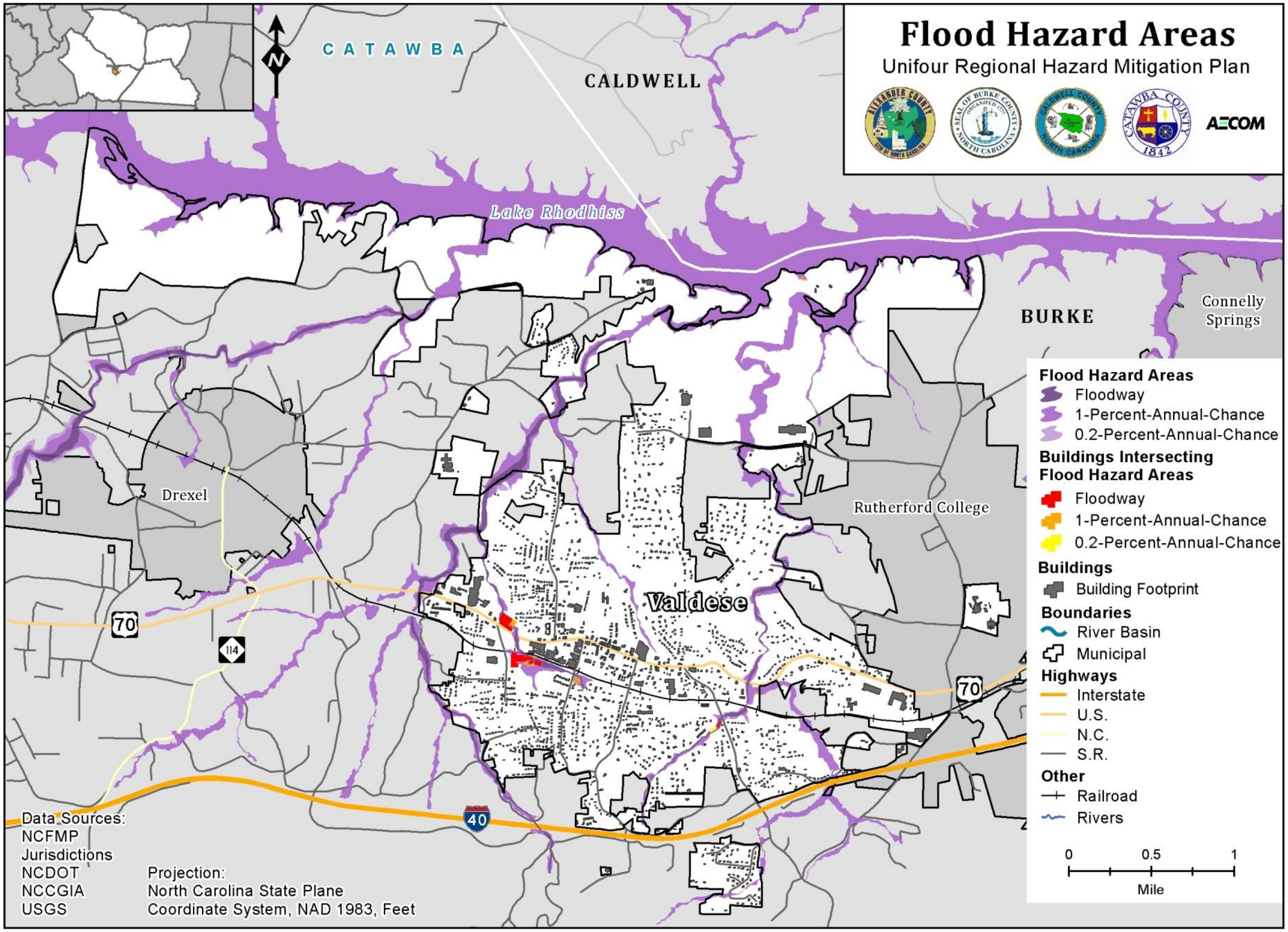


**Figure 4.18: Flood Hazard Areas in Rutherford College**

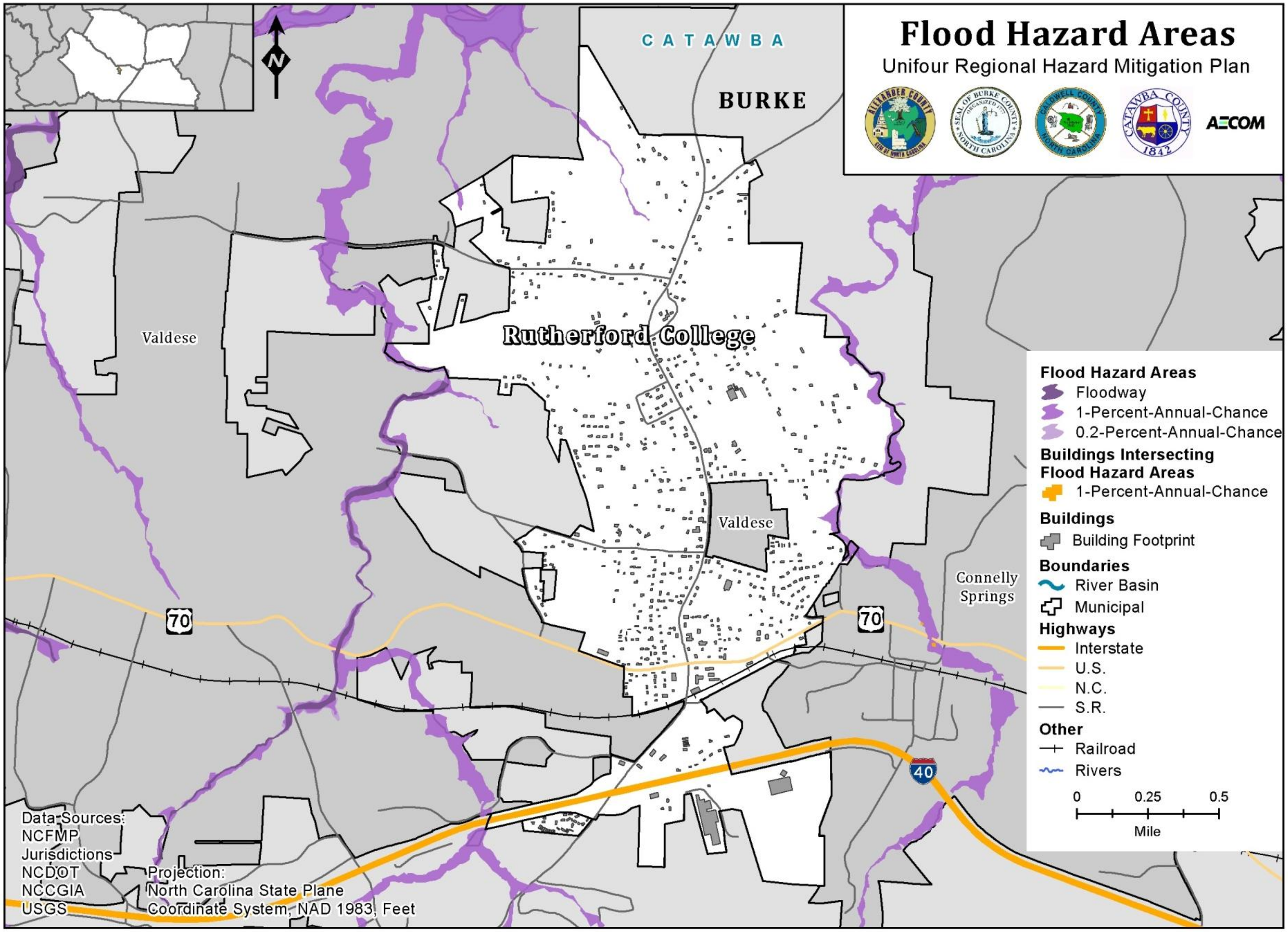


**Figure 4.19: Flood Hazard Areas in Caldwell County**

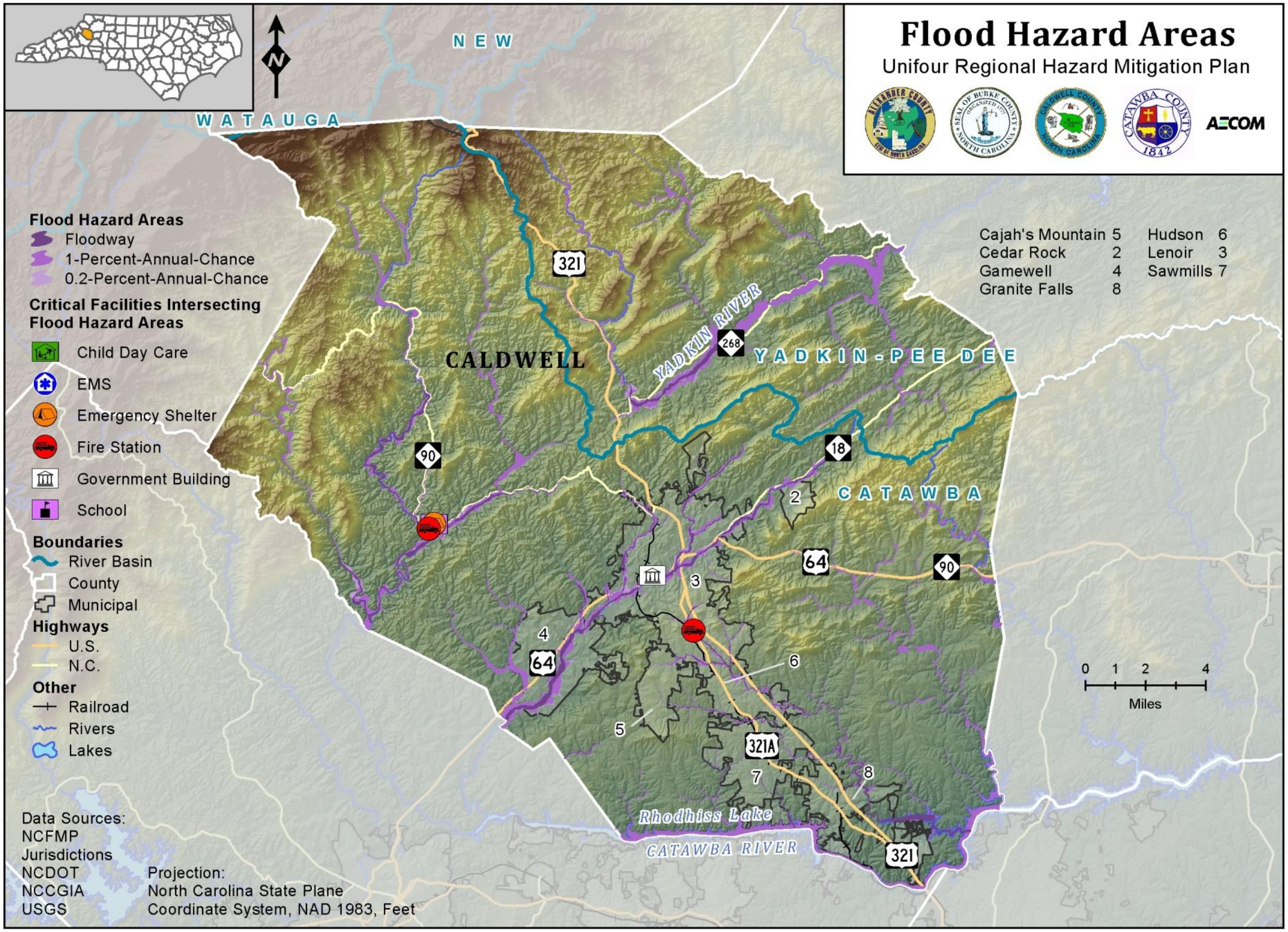


**Figure 4.20: Flood Hazard Areas in the Town of Cajah's Mountain**

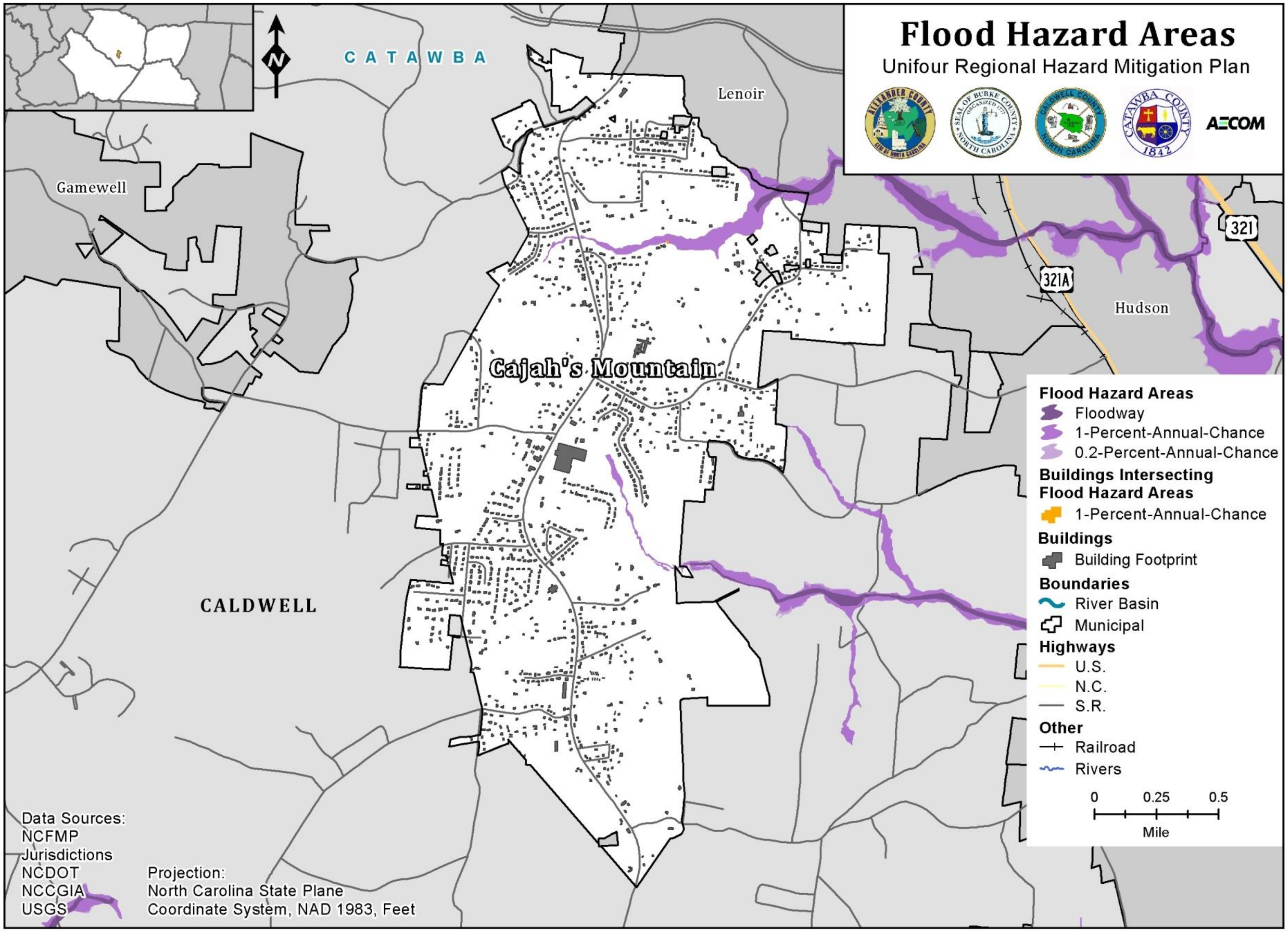


**Figure 4.21: Flood Hazard Areas in the Village of Cedar Rock**

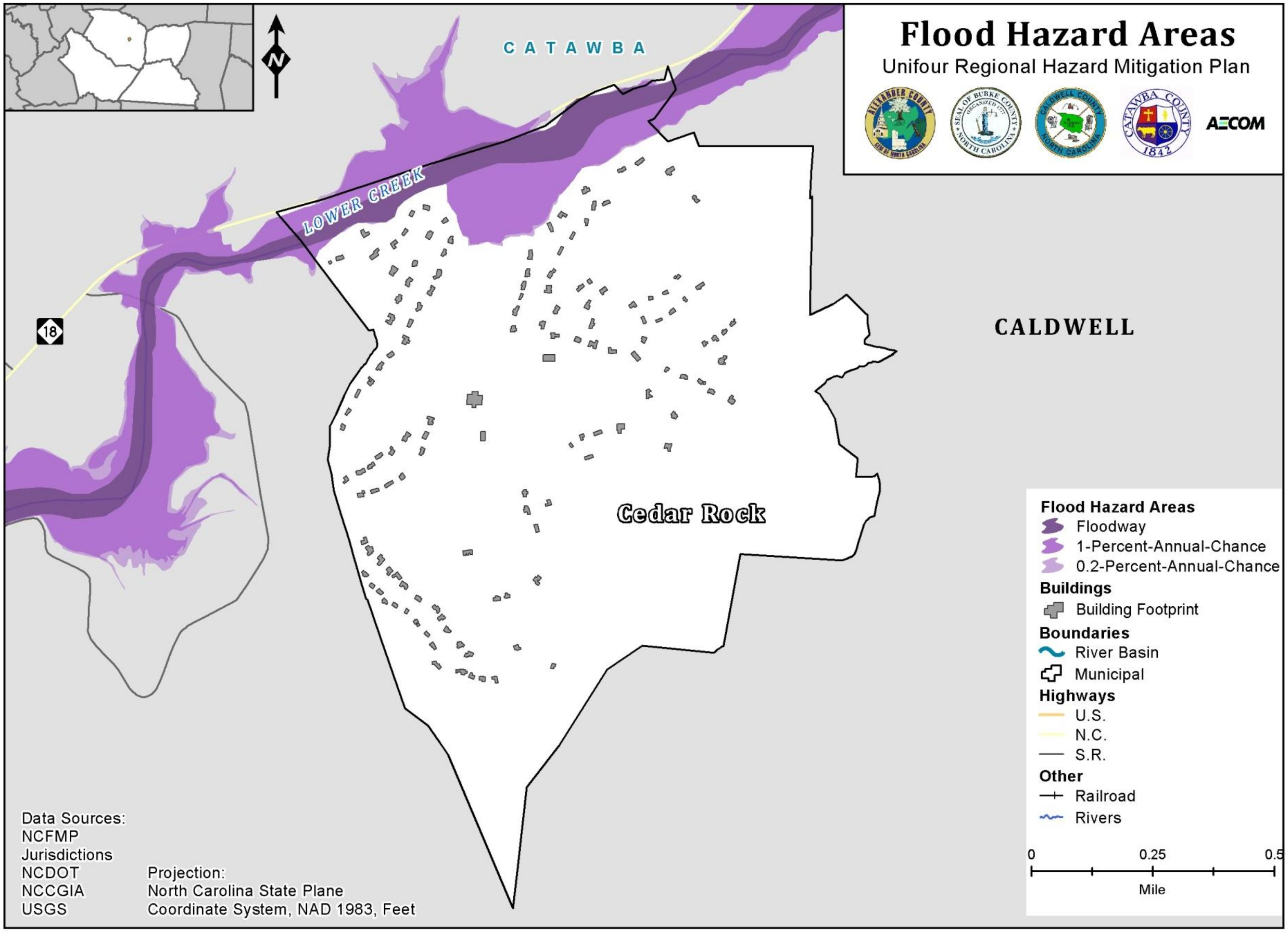


**Figure 4.22: Flood Hazard Areas in the Town of Gamewell**

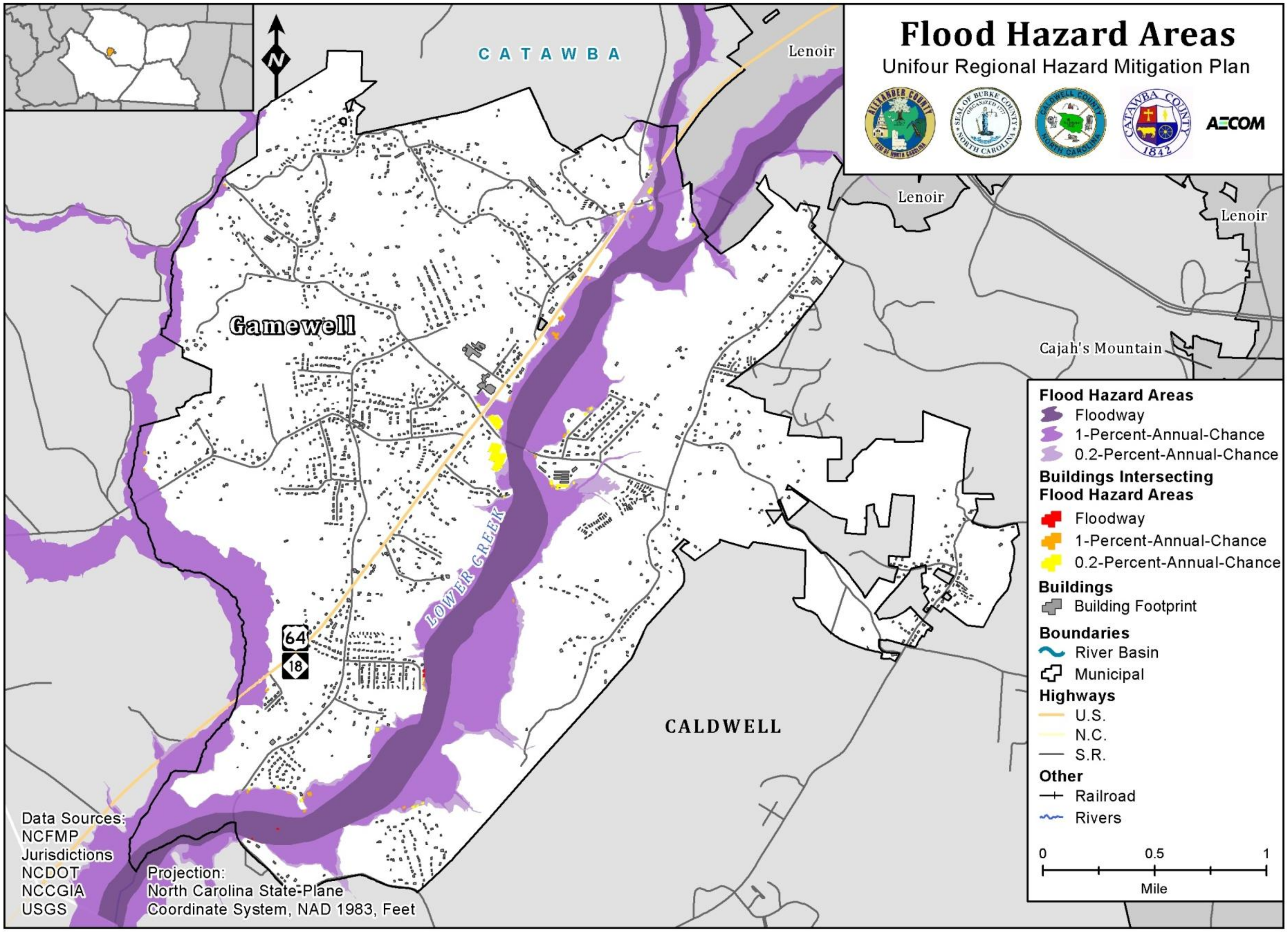


**Figure 4.23: Flood Hazard Areas in the Town of Granite Falls**

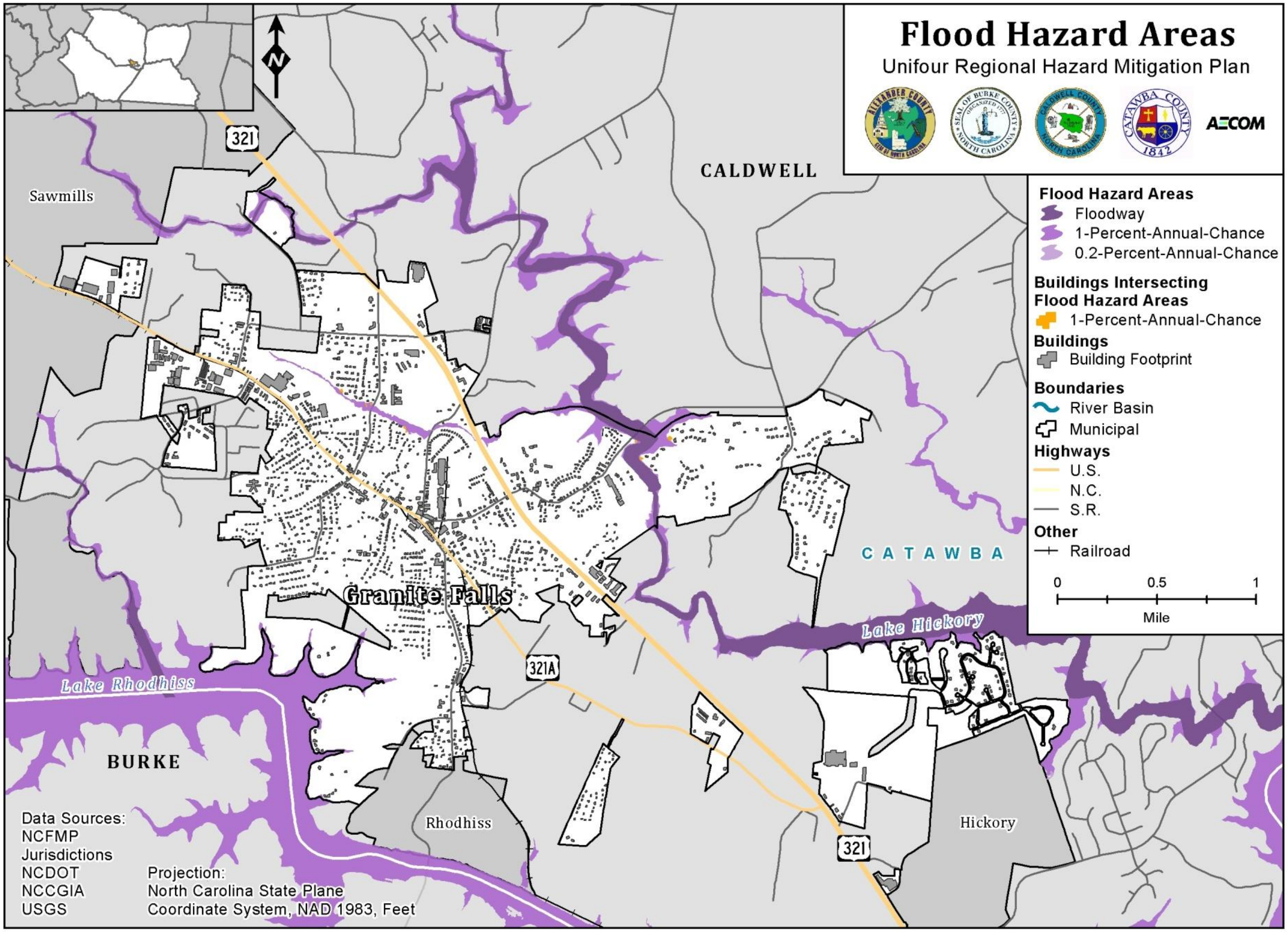


**Figure 4.24: Flood Hazard Areas in the Town of Hudson**

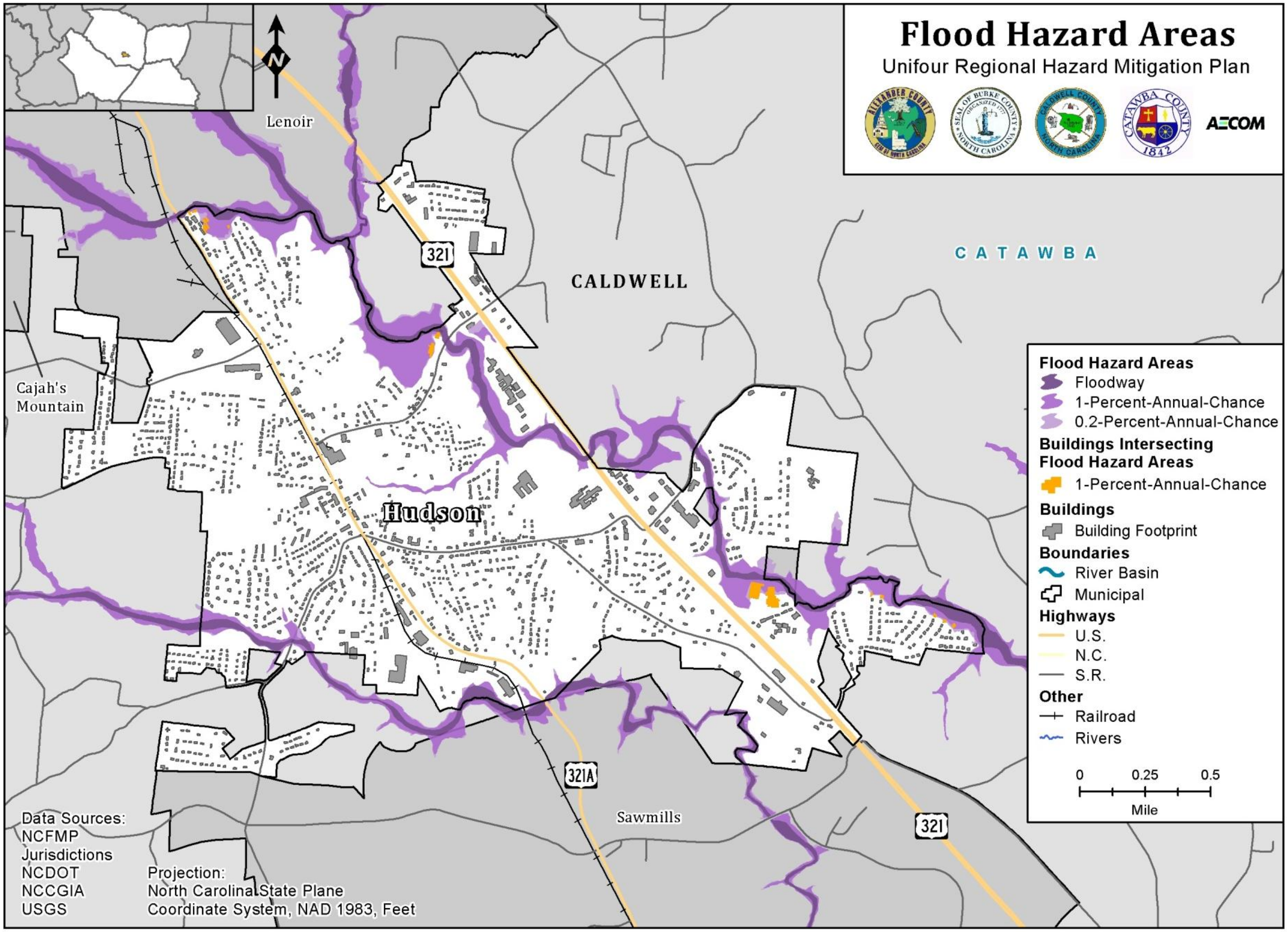


**Figure 4.25: Flood Hazard Areas in the City of Lenoir**

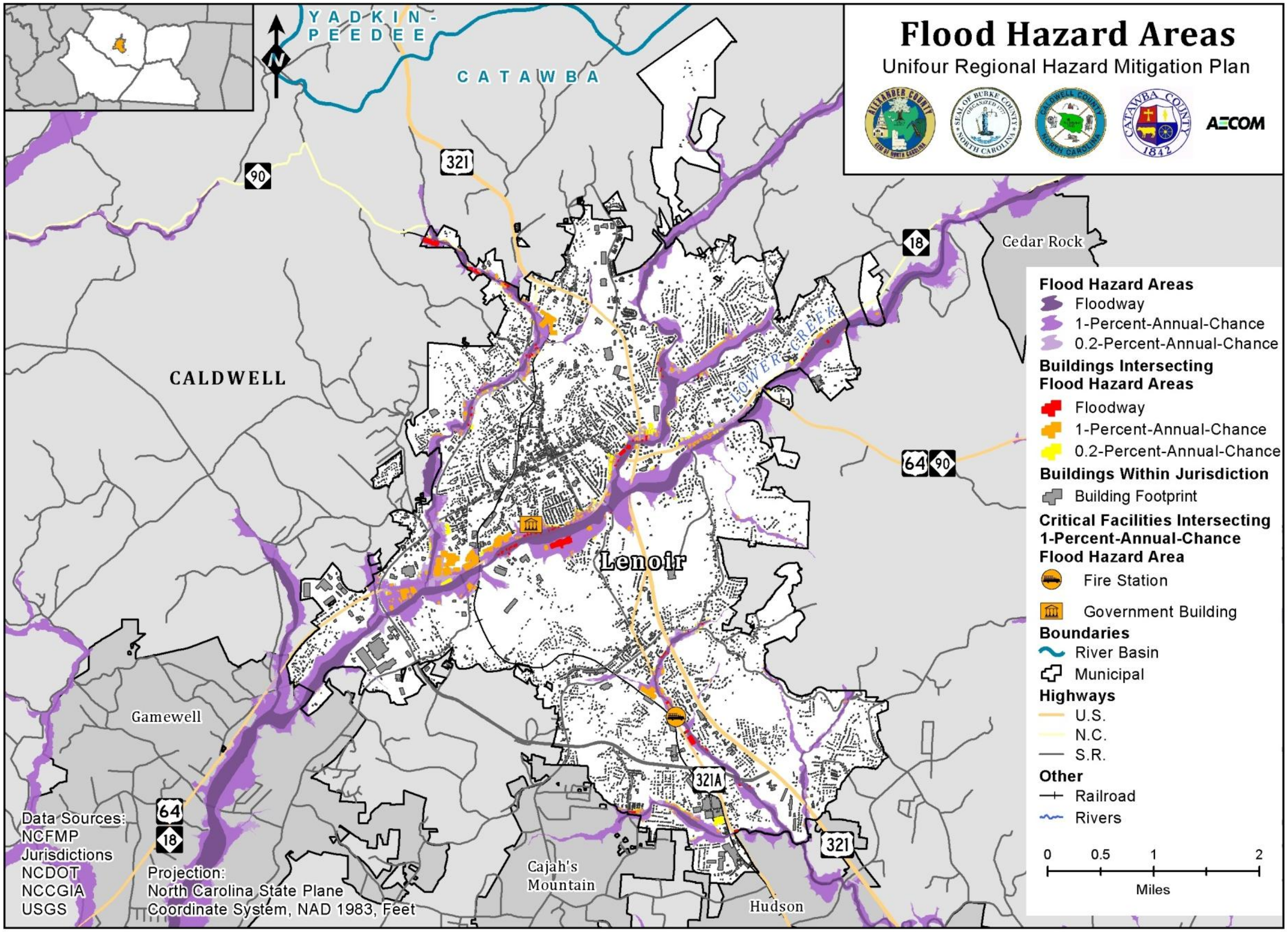


**Figure 4.26: Flood Hazard Areas in the Town of Rhodhiss**

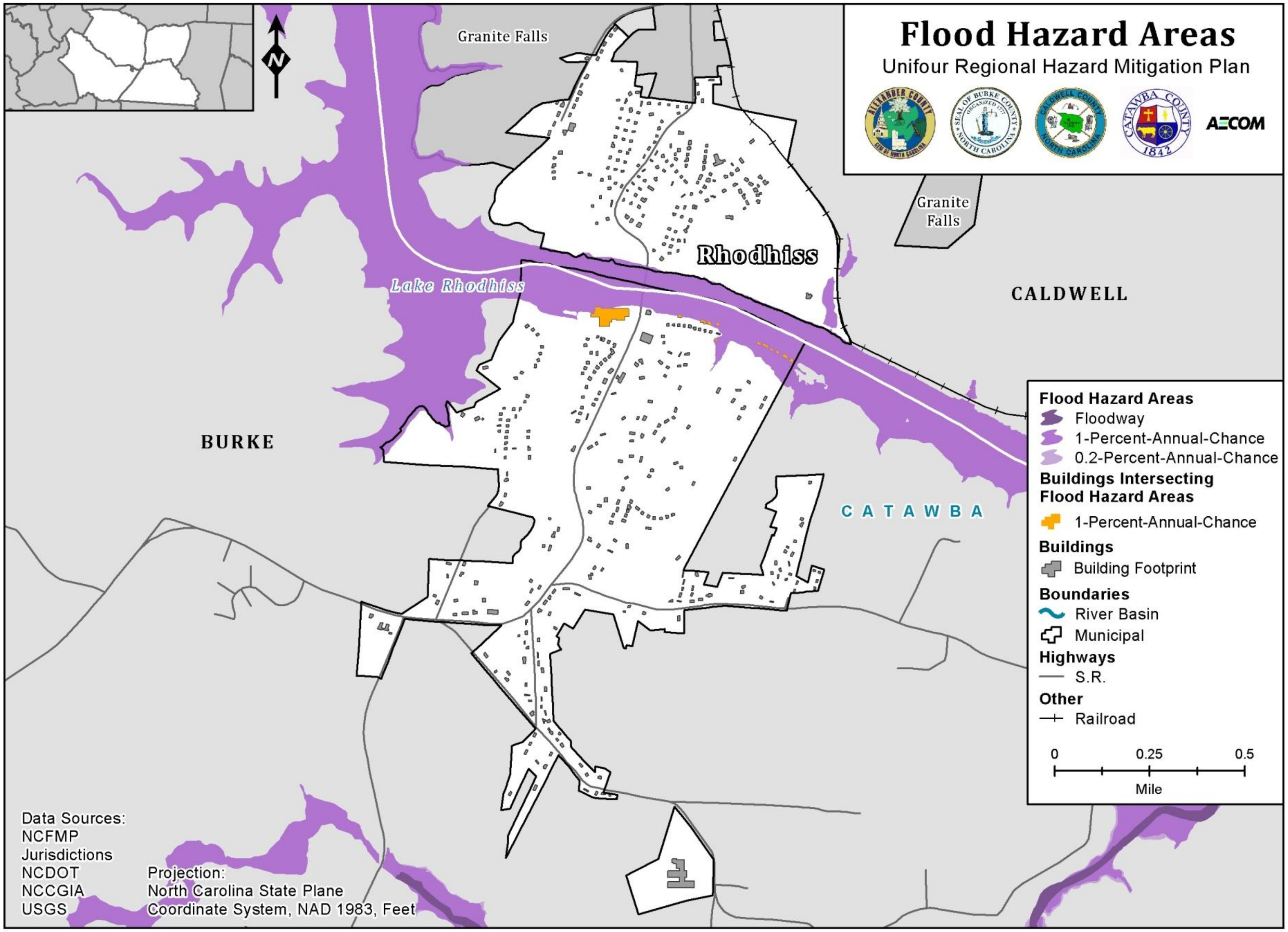


**Figure 4.27: Flood Hazard Areas in the Town of Sawmills**

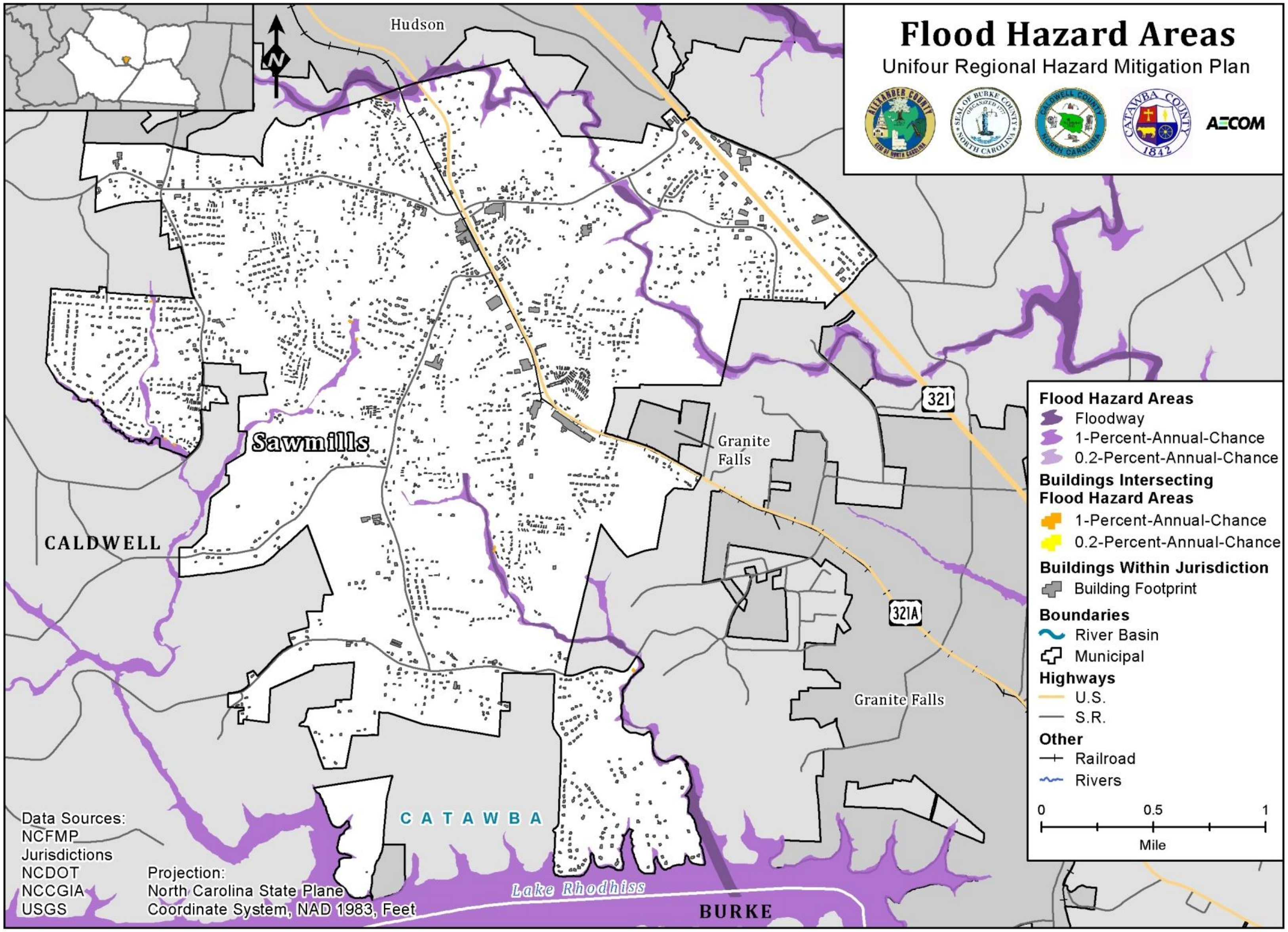


**Figure 4.28: Flood Hazard Areas in Catawba County**

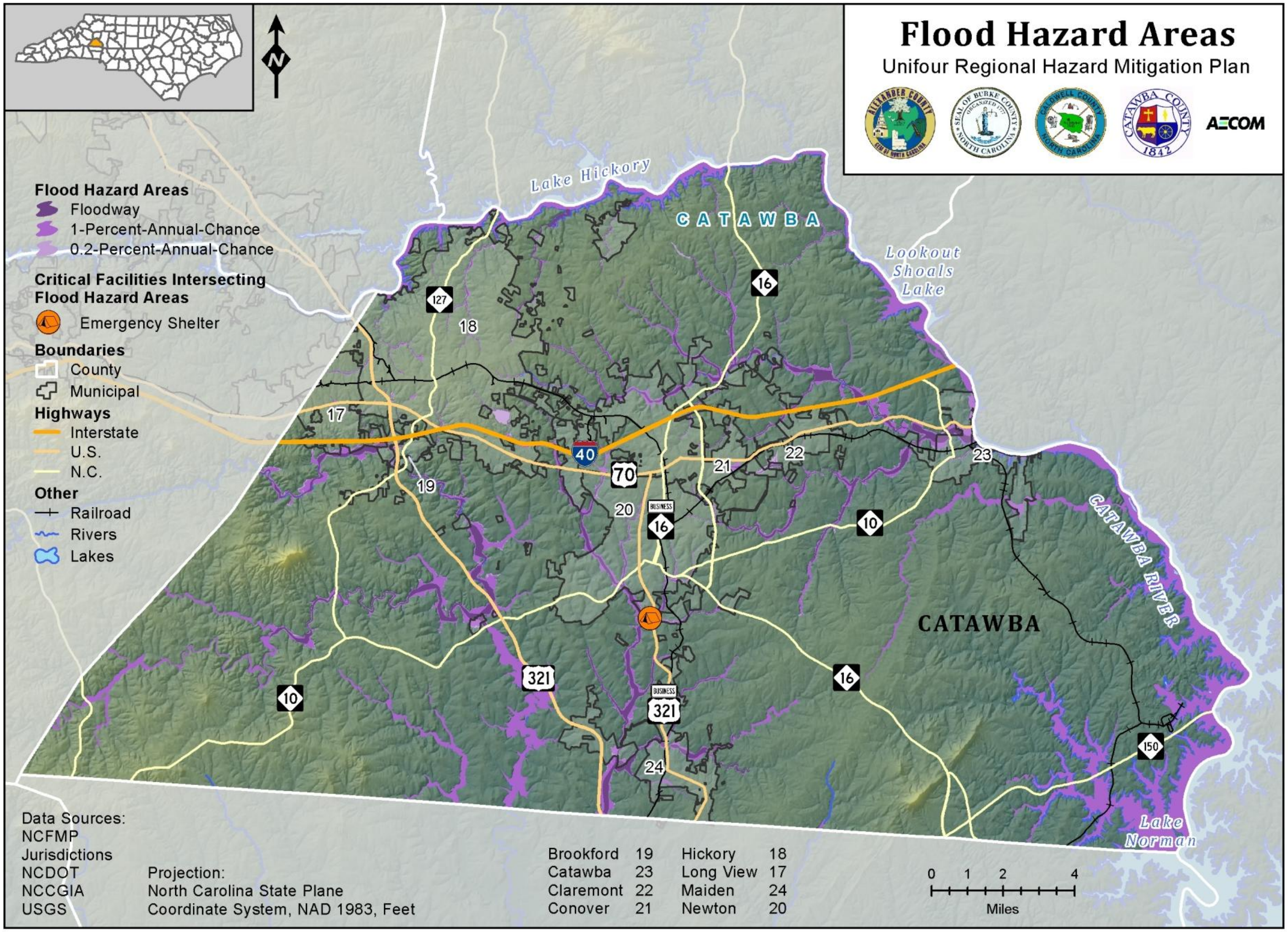


**Figure 4.29: Flood Hazard Areas in the Town of Brookford**

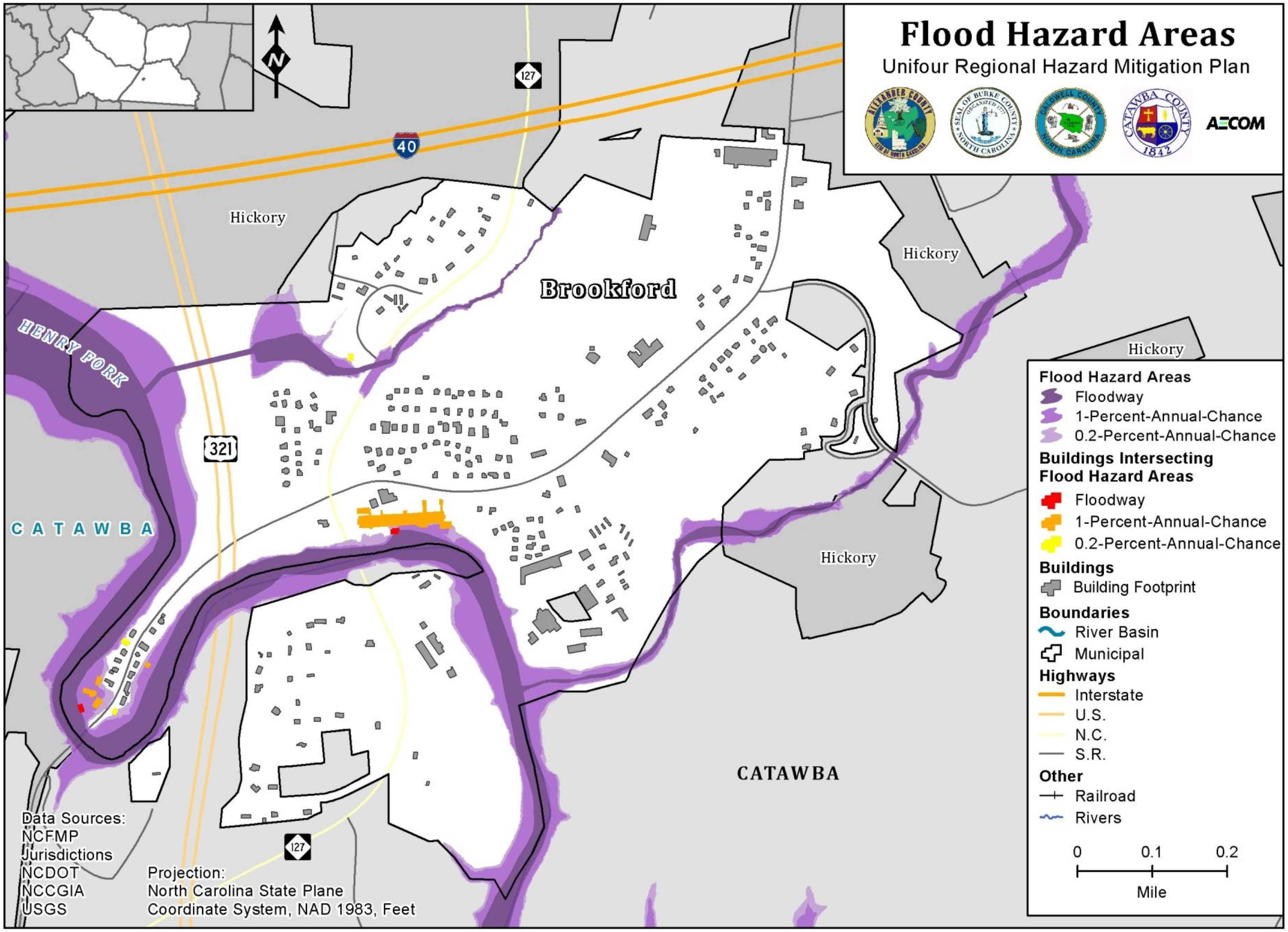


**Figure 4.30: Flood Hazard Areas in the Town of Catawba**

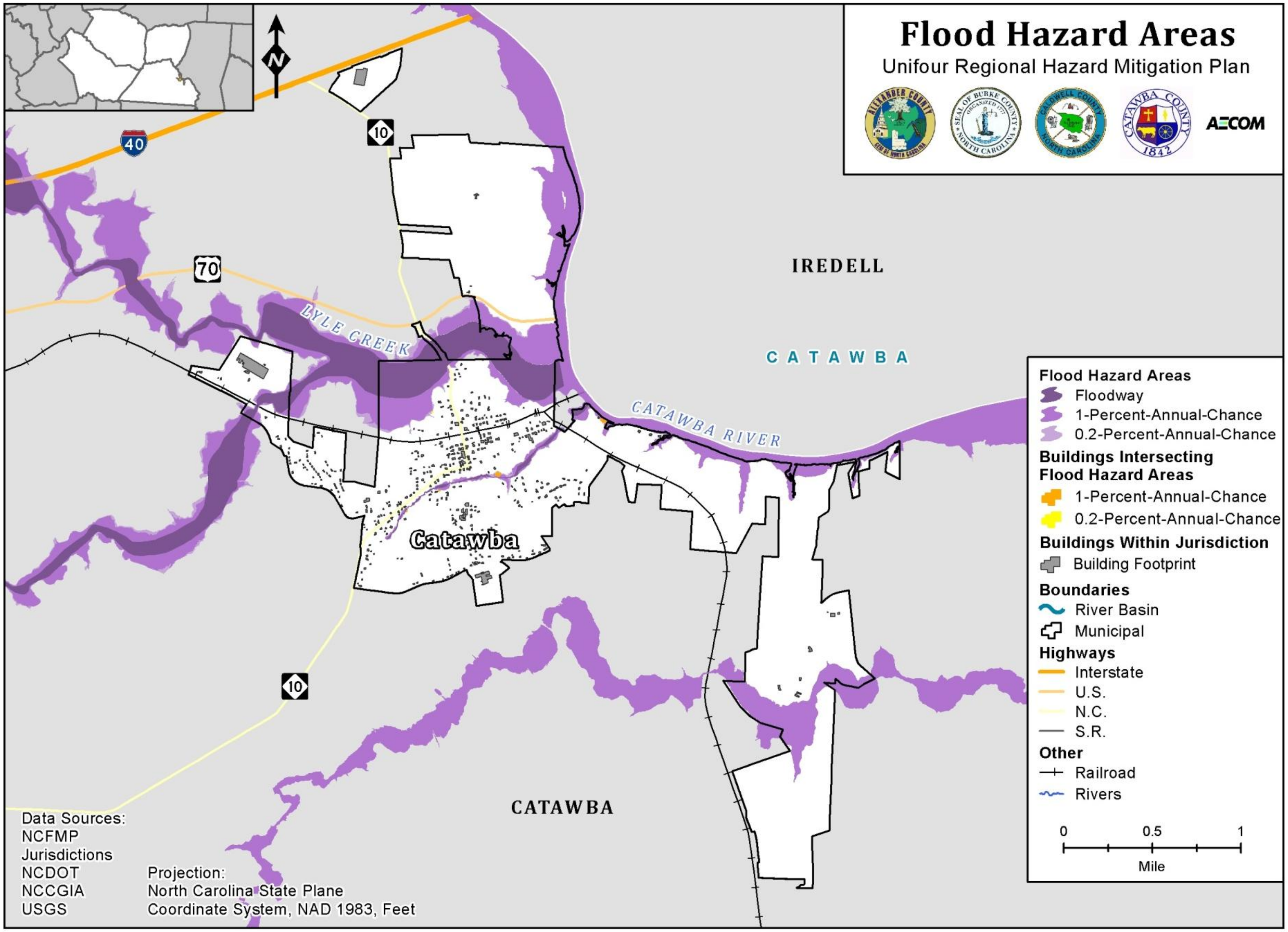


**Figure 4.31: Flood Hazard Areas in the City of Claremont**

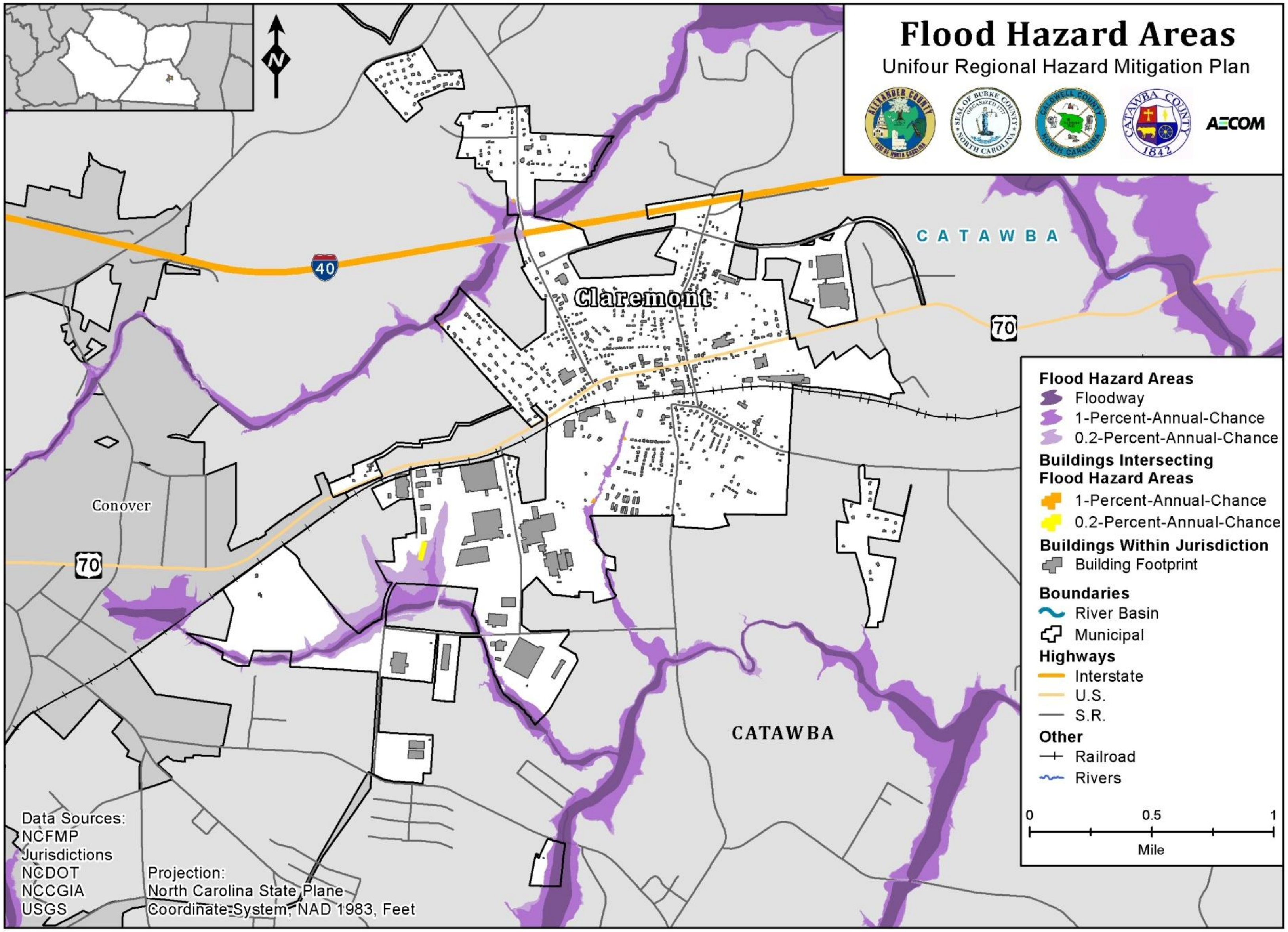


**Figure 4.32: Flood Hazard Areas in the City of Conover**

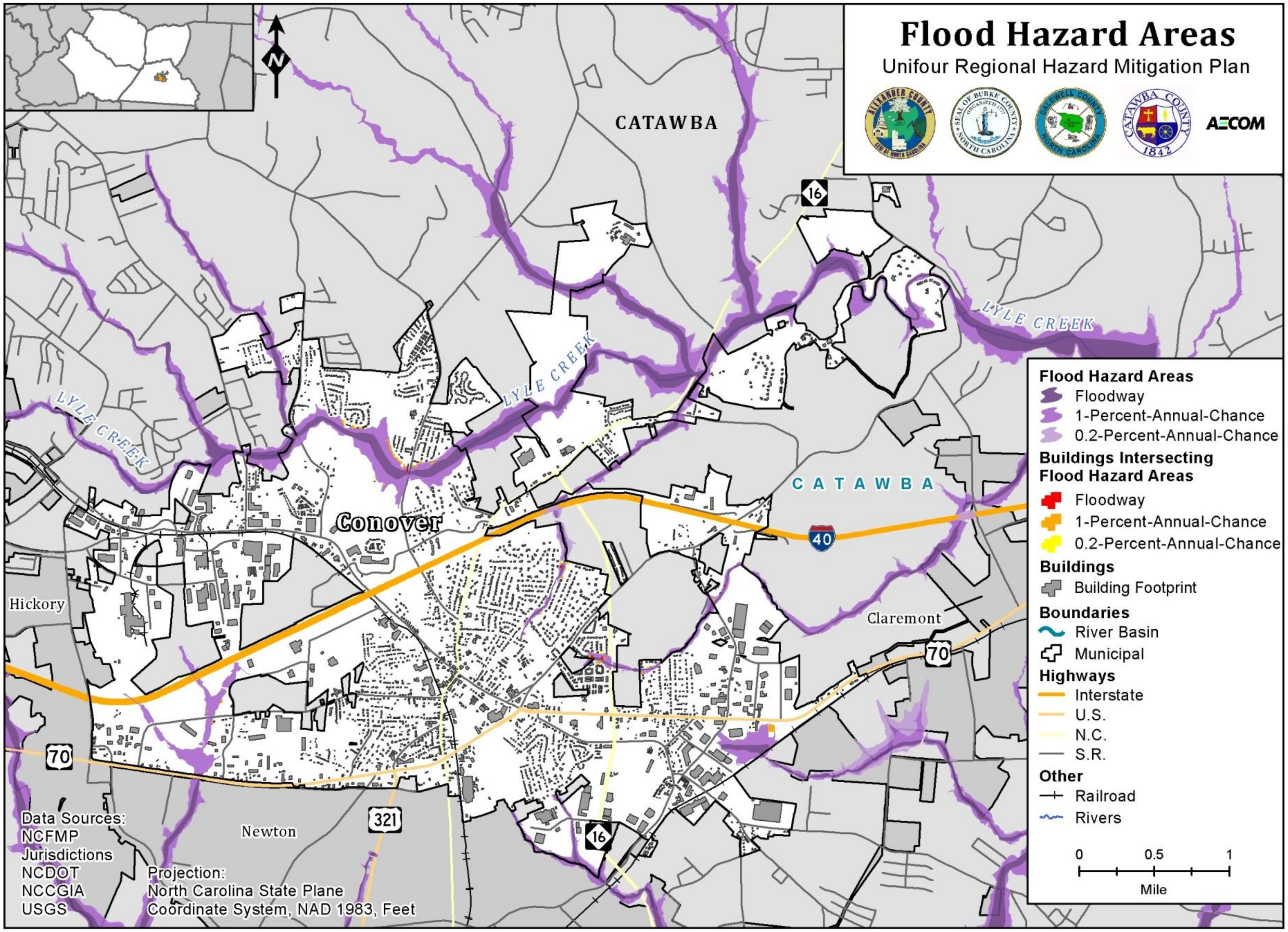


**Figure 4.33: Flood Hazard Areas in the City of Hickory**

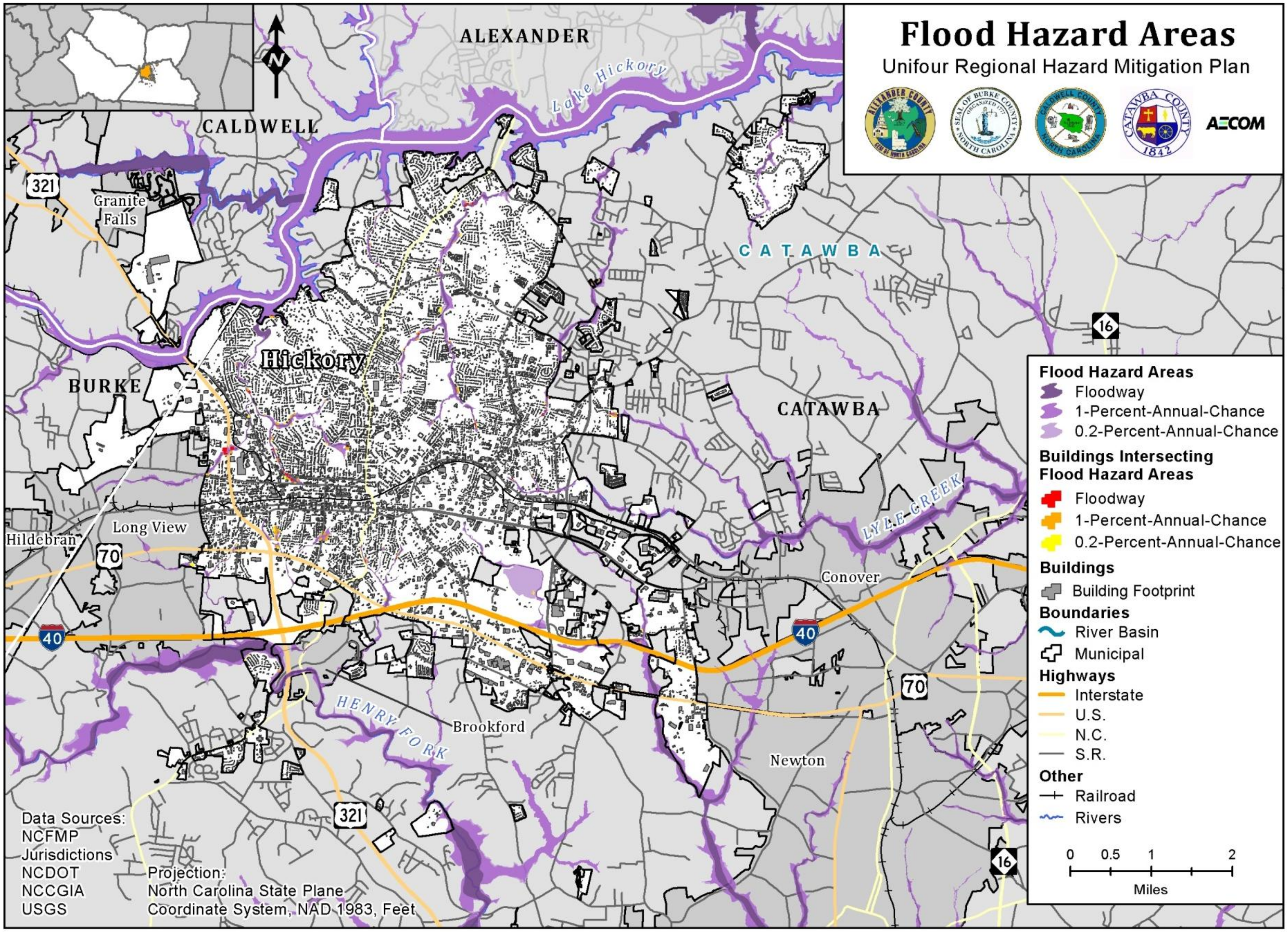


**Figure 4.34: Flood Hazard Areas in the Town of Long View**

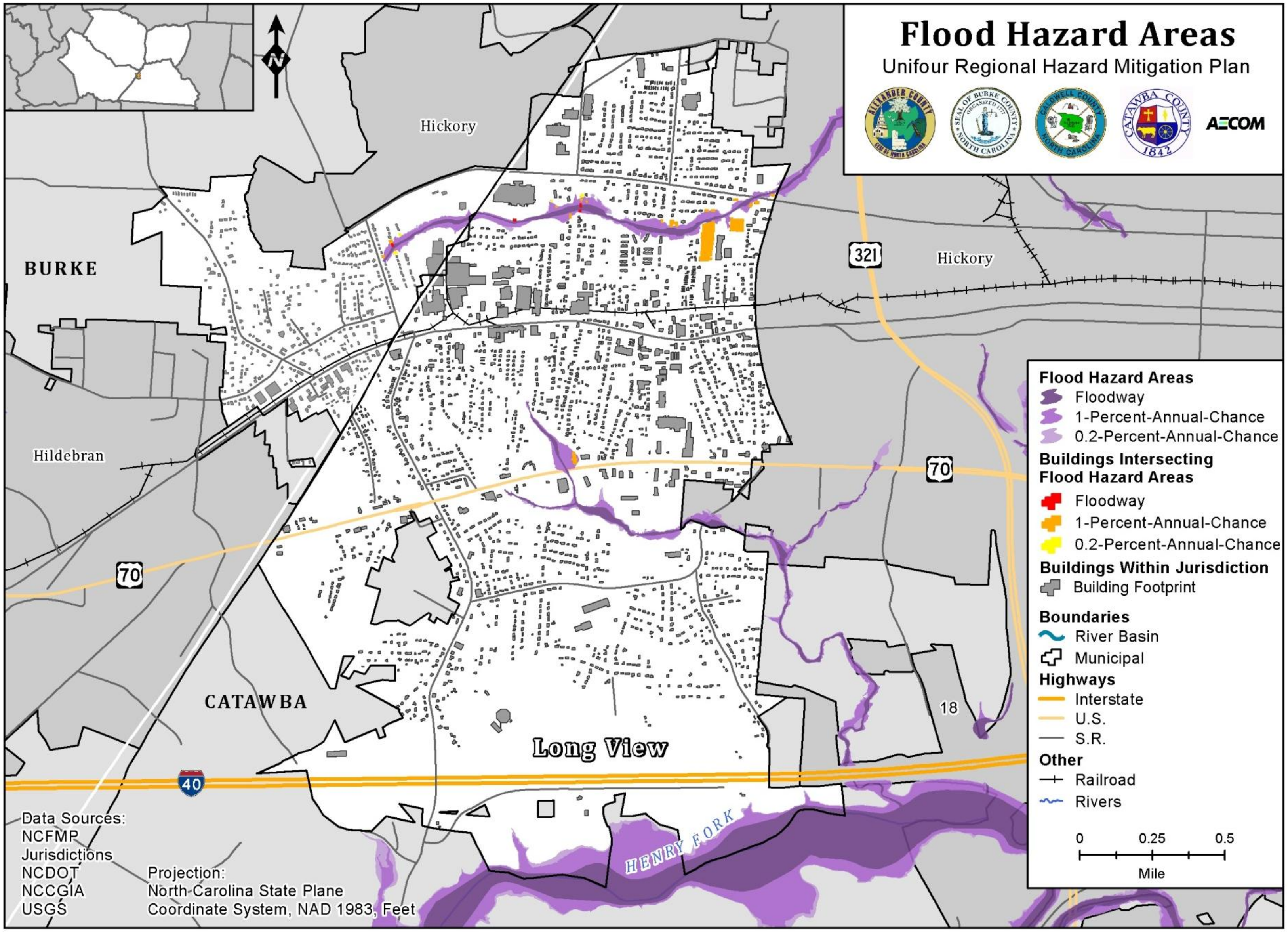


**Figure 4.35: Flood Hazard Areas in the Town of Maiden**

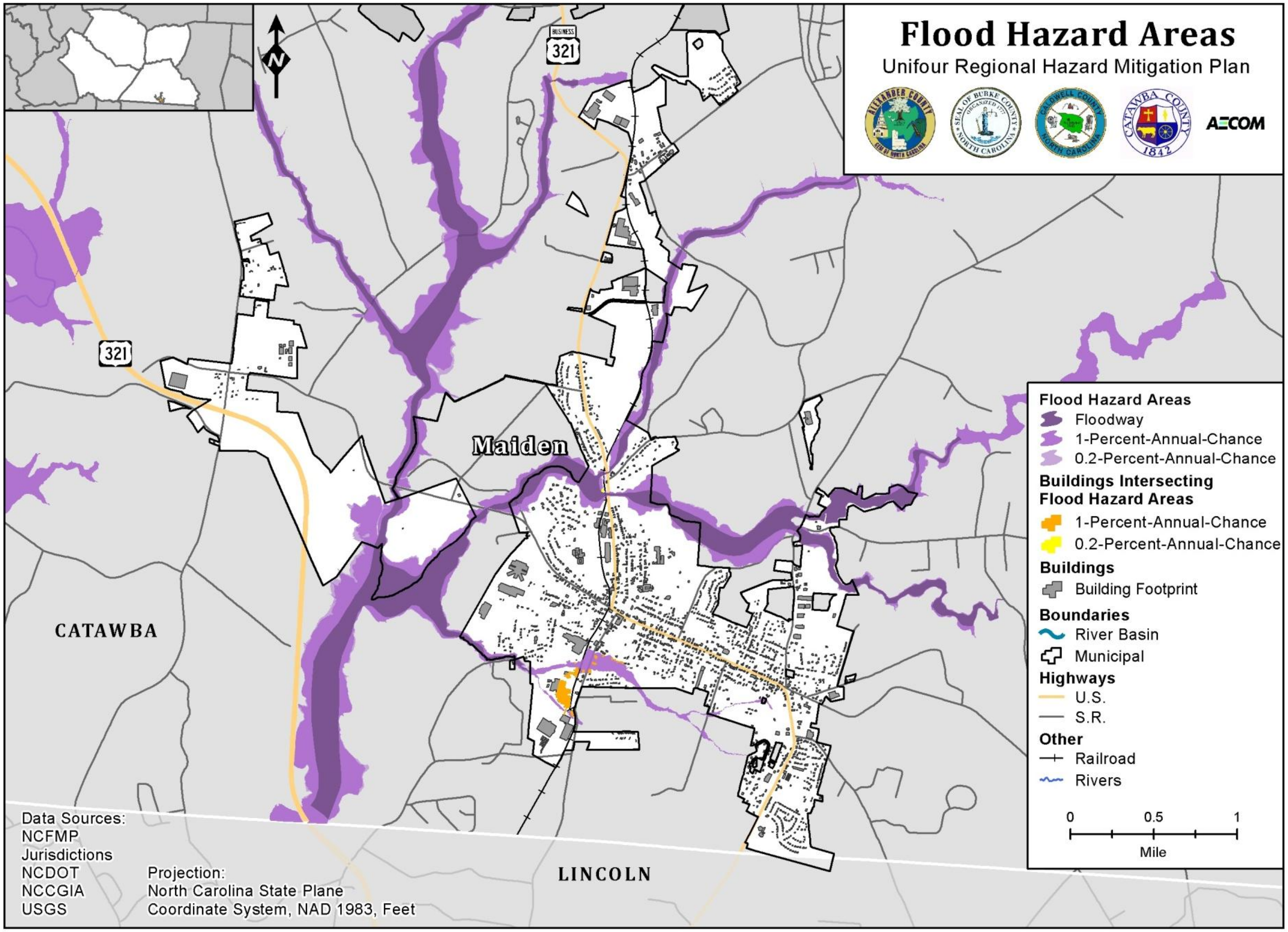


**Figure 4.36: Flood Hazard Areas in the City of Newton**

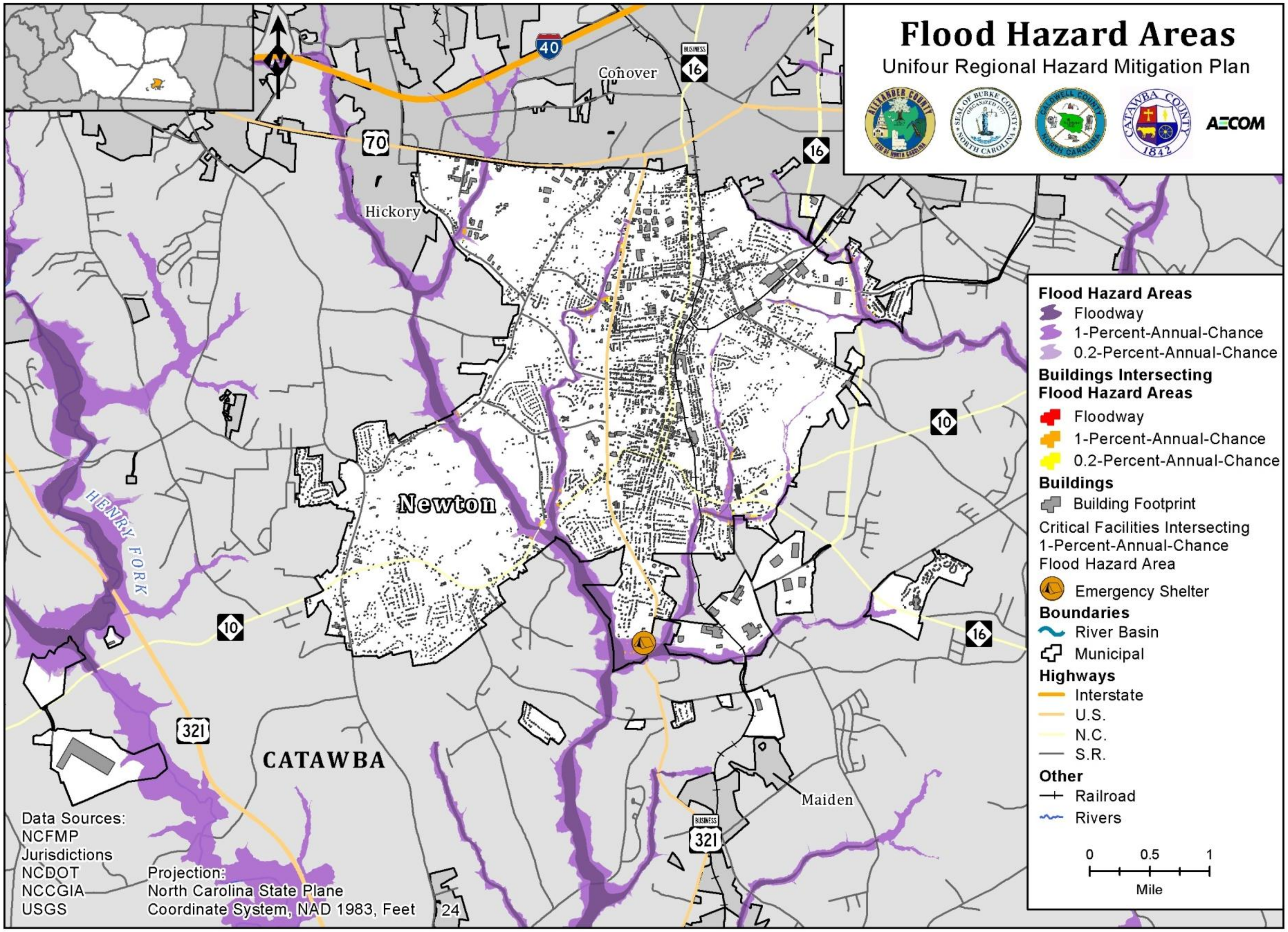


**Table 4.9: Historical Occurrences of Flooding (1993-2013)**

| Location | Date | Type | Deaths | Injuries | Reported Property Damage | Reported Crop Damage |
|---|---|---|---|---|---|---|
| **ALEXANDER COUNTY** | | | | | | |
| Countywide | 03/23/93 | Flash Flood | N/A | N/A | N/A | N/A |
| Countywide | 03/20/03 | Flash Flood | 0 | 0 | $0 | $0 |
| Bethlehem | 06/16/03 | Flash Flood | 0 | 0 | $0 | $0 |
| Countywide | 09/07/04 | Flood | 0 | 0 | $100,000 | $0 |
| Vashti | 05/26/09 | Flash Flood | 0 | 0 | $0 | $0 |
| All Healing Springs | 06/03/09 | Flash Flood | 0 | 0 | $0 | $0 |
| All Healing Springs | 01/24/10 | Flash Flood | 0 | 0 | $0 | $0 |
| Millersville | 01/24/10 | Flash Flood | 0 | 0 | $0 | $0 |
| All Healing Springs | 05/14/12 | Flash Flood | 0 | 0 | $0 | $0 |
| Smiths Store | 07/11/13 | Flash Flood | 0 | 0 | $0 | $0 |
| *Subtotal Alexander* | *10 Events* | | *0* | *0* | *$100,000* | *$0* |
| **BURKE COUNTY** | | | | | | |
| Countywide | 10/05/95 | Flash Flood | N/A | N/A | $0 | $0 |
| Countywide | 01/19/96 | Flood | 0 | 0 | $0 | $0 |
| Countywide | 01/27/96 | Flood | 0 | 0 | $0 | $0 |
| Table Rock | 08/12/96 | Flash Flood | 0 | 0 | $0 | $0 |
| Morganton | 08/12/96 | Flash Flood | 0 | 0 | $0 | $0 |
| Morganton | 07/29/97 | Flash Flood | 0 | 0 | $4,300 | $0 |
| Morganton | 09/06/98 | Flood | 0 | 0 | $0 | $0 |
| Jonas Ridge | 07/07/99 | Flash Flood | 0 | 0 | $0 | $0 |
| Morganton | 05/20/00 | Flood | 0 | 0 | $0 | $0 |
| Morganton | 09/02/00 | Flash Flood | 0 | 0 | $0 | $0 |
| Jonas Ridge | 04/17/02 | Flood | 0 | 0 | $2,000 | $0 |
| Morganton | 08/17/02 | Flash Flood | 0 | 0 | $0 | $0 |
| Countywide | 04/10/03 | Flood | 0 | 0 | $0 | $0 |
| Morganton | 06/15/03 | Flash Flood | 0 | 0 | $0 | $0 |
| Morganton | 06/16/03 | Flash Flood | 0 | 0 | $0 | $0 |
| Morganton | 07/13/03 | Flash Flood | 0 | 0 | $0 | $0 |
| Morganton | 08/07/03 | Flash Flood | 0 | 0 | $0 | $0 |
| Hildebran | 08/09/03 | Flash Flood | 0 | 0 | $0 | $0 |
| Countywide | 11/19/03 | Flood | 0 | 0 | $0 | $0 |
| Countywide | 09/07/04 | Flood | 0 | 0 | $9,000,000 | $0 |
| Countywide | 09/17/04 | Flood | 0 | 0 | $0 | $0 |
| Northeast Portion | 05/19/05 | Flash Flood | 0 | 0 | $0 | $0 |
| Countywide | 07/07/05 | Flood | 0 | 0 | $0 | $0 |
| Morganton | 07/19/05 | Flash Flood | 0 | 0 | $0 | $0 |
| Morganton | 07/27/05 | Flash Flood | 0 | 0 | $0 | $0 |
| Western Portion | 08/17/05 | Flash Flood | 0 | 0 | $0 | $0 |
| Countywide | 08/18/05 | Flood | 0 | 0 | $0 | $0 |

| Location | Date | Type | Deaths | Injuries | Reported Property Damage | Reported Crop Damage |
|---|---|---|---|---|---|---|
| Countywide | 10/07/05 | Flood | 0 | 0 | $0 | $0 |
| Table Rock | 08/26/08 | Flash Flood | 0 | 0 | $0 | $0 |
| Burke Chapel | 05/26/09 | Flash Flood | 0 | 0 | $0 | $0 |
| Table Rock | 01/24/10 | Flash Flood | 0 | 0 | $0 | $0 |
| Table Rock | 01/25/10 | Flood | 0 | 0 | $0 | $0 |
| Table Rock | 08/15/10 | Flash Flood | 0 | 0 | $0 | $0 |
| Chesterfield | 03/06/11 | Flash Flood | 0 | 0 | $0 | $0 |
| Joy | 04/16/11 | Flood | 0 | 0 | $0 | $0 |
| Joy | 04/16/11 | Flash Flood | 0 | 0 | $0 | $0 |
| Joy | 04/16/11 | Flash Flood | 0 | 0 | $0 | $0 |
| Oak Hill | 04/16/11 | Flash Flood | 0 | 0 | $0 | $0 |
| Chesterfield | 11/29/11 | Flash Flood | 0 | 0 | $0 | $0 |
| Linville Falls | 09/18/12 | Flash Flood | 0 | 0 | $0 | $0 |
| Joy | 05/05/13 | Flood | 0 | 0 | $30,000 | $0 |
| Drexel | 06/09/13 | Flash Flood | 0 | 0 | $0 | $0 |
| Chesterfield | 07/04/13 | Flash Flood | 0 | 0 | $0 | $0 |
| Joy | 07/04/13 | Flood | 0 | 0 | $0 | $0 |
| Glen Alpine | 07/12/13 | Flash Flood | 0 | 0 | $60,000 | $0 |
| *Subtotal Burke* | *45 Events* | | *0* | *0* | *$9,096,300* | *$0* |
| **CALDWELL COUNTY** | | | | | | |
| Countywide | 01/27/96 | Flood | 0 | 0 | $0 | $0 |
| Draco | 08/03/96 | Flash Flood | 0 | 0 | $0 | $0 |
| Mortimer | 08/11/96 | Flash Flood | 0 | 0 | $0 | $0 |
| Collettsville | 08/11/96 | Flash Flood | 0 | 0 | $0 | $0 |
| Edgemont | 08/11/96 | Flash Flood | 0 | 0 | $0 | $0 |
| Collettsville | 08/12/96 | Flash Flood | 0 | 0 | $0 | $0 |
| Collettsville | 01/08/98 | Flash Flood | 0 | 0 | $0 | $0 |
| Western Portion | 03/20/98 | Flash Flood | 0 | 0 | $0 | $0 |
| Lenoir | 04/17/98 | Flash Flood | 0 | 0 | $0 | $0 |
| Lenoir | 09/02/00 | Flash Flood | 0 | 0 | $0 | $0 |
| Lenoir | 07/02/01 | Flash Flood | 0 | 0 | $50,000 | $0 |
| Lenoir | 07/25/01 | Flash Flood | 0 | 0 | $0 | $0 |
| Countywide | 04/10/03 | Flood | 0 | 0 | $0 | $0 |
| Lenoir | 06/14/03 | Flash Flood | 0 | 0 | $0 | $0 |
| Lenoir | 06/15/03 | Flash Flood | 0 | 0 | $0 | $0 |
| Lenoir | 06/18/03 | Flash Flood | 0 | 0 | $0 | $0 |
| Lenoir | 06/19/03 | Flash Flood | 0 | 0 | $0 | $0 |
| Mortimer | 07/05/03 | Flash Flood | 0 | 0 | $0 | $0 |
| Lenoir | 07/06/03 | Flash Flood | 0 | 0 | $20,000 | $0 |
| Lenoir | 08/06/03 | Flash Flood | 0 | 0 | $5,000 | $0 |
| Lenoir | 08/07/03 | Flash Flood | 0 | 0 | $0 | $0 |

| Location | Date | Type | Deaths | Injuries | Reported Property Damage | Reported Crop Damage |
|---|---|---|---|---|---|---|
| Countywide | 11/19/03 | Flood | 0 | 0 | $5,000 | $0 |
| Lenoir | 05/22/04 | Flash Flood | 0 | 0 | $0 | $0 |
| Lenoir | 06/21/04 | Flash Flood | 0 | 0 | $0 | $0 |
| Countywide | 09/02/04 | Flood | 0 | 0 | $0 | $0 |
| Countywide | 09/07/04 | Flood | 0 | 0 | $1,000,000 | $1,500,000 |
| Countywide | 09/17/04 | Flood | 0 | 0 | $20,000 | $0 |
| Lenoir | 06/07/05 | Flash Flood | 0 | 0 | $15,000 | $0 |
| Lenoir | 06/08/05 | Flash Flood | 0 | 0 | $0 | $0 |
| Lenoir | 07/03/05 | Flash Flood | 0 | 0 | $20,000 | $0 |
| Countywide | 07/04/05 | Flood | 0 | 0 | $0 | $0 |
| Countywide | 07/07/05 | Flood | 0 | 0 | $0 | $0 |
| Countywide | 08/18/05 | Flood | 0 | 0 | $0 | $0 |
| Western Portion | 08/18/05 | Flash Flood | 0 | 0 | $0 | $0 |
| Collettsville | 08/26/08 | Flash Flood | 0 | 0 | $0 | $0 |
| Yadkin Valley | 05/16/09 | Flash Flood | 0 | 0 | $0 | $0 |
| Lenoir | 06/10/09 | Flash Flood | 0 | 0 | $20,000 | $0 |
| Rufus | 03/06/11 | Flash Flood | 0 | 0 | $0 | $0 |
| Mortimer | 04/16/11 | Flash Flood | 0 | 0 | $50,000 | $0 |
| Yadkin Valley | 05/14/12 | Flash Flood | 0 | 0 | $0 | $0 |
| Warrior | 05/14/12 | Flash Flood | 0 | 0 | $0 | $0 |
| Abingdon | 05/14/12 | Flash Flood | 0 | 0 | $0 | $0 |
| Rufus | 07/11/12 | Flash Flood | 0 | 0 | $0 | $0 |
| Richland | 08/09/12 | Flash Flood | 0 | 0 | $5,000 | $0 |
| Edgemont | 01/30/13 | Flash Flood | 0 | 0 | $50,000 | $0 |
| Edgemont | 05/05/13 | Flood | 0 | 0 | $30,000 | $0 |
| Oak Hill | 06/09/13 | Flash Flood | 0 | 0 | $0 | $0 |
| Valmead | 06/09/13 | Flash Flood | 0 | 0 | $0 | $0 |
| Draco | 07/02/13 | Flood | 0 | 0 | $0 | $0 |
| Mortimer | 07/04/13 | Flash Flood | 0 | 0 | $300,000 | $0 |
| Rufus | 07/07/13 | Flash Flood | 0 | 0 | $0 | $0 |
| Grace Chapel | 07/09/13 | Flash Flood | 0 | 0 | $0 | $0 |
| Collettsville | 07/12/13 | Flash Flood | 0 | 0 | $50,000 | $0 |
| Collettsville | 07/27/13 | Flash Flood | 2 | 0 | $0 | $0 |
| Dudley Shoals | 09/01/13 | Flash Flood | 0 | 0 | $0 | $0 |
| Collettsville | 09/02/13 | Flash Flood | 1 | 0 | $0 | $0 |
| *Subtotal Caldwell* | *56 Events* | | *3* | *0* | *$1,640,000* | *$1,500,000* |
| **CATAWBA COUNTY** | | | | | | |
| Hickory | 08/17/02 | Flash Flood | 0 | 0 | $3,000,000 | $0 |
| Countywide | 03/20/03 | Flash Flood | 0 | 0 | $0 | $0 |
| Claremont | 05/02/03 | Flash Flood | 0 | 0 | $0 | $0 |
| Conover | 05/03/03 | Flash Flood | 0 | 0 | $0 | $0 |

| Location | Date | Type | Deaths | Injuries | Reported Property Damage | Reported Crop Damage |
|---|---|---|---|---|---|---|
| Hickory | 06/16/03 | Flash Flood | 0 | 0 | $60,000 | $0 |
| Long View | 08/06/03 | Flash Flood | 0 | 0 | $5,000 | $0 |
| Countywide | 09/08/04 | Flood | 0 | 0 | $130,000 | $0 |
| Long View | 05/19/05 | Flash Flood | 0 | 0 | $5,000 | $0 |
| Hickory | 07/07/05 | Flash Flood | 0 | 0 | $0 | $0 |
| Countywide | 10/07/05 | Flood | 0 | 0 | $30,000 | $0 |
| Maiden | 08/17/08 | Flash Flood | 0 | 0 | $50,000 | $0 |
| Startown | 08/27/08 | Flash Flood | 0 | 0 | $0 | $0 |
| Brookford | 01/24/10 | Flash Flood | 0 | 0 | $0 | $0 |
| Claremont | 05/14/12 | Flash Flood | 0 | 0 | $20,000 | $0 |
| Long View | 07/21/12 | Flash Flood | 0 | 0 | $1,000 | $0 |
| Claremont | 05/06/13 | Flood | 0 | 0 | $2,000,000 | $0 |
| Startown | 06/05/13 | Flash Flood | 0 | 0 | $0 | $0 |
| Claremont | 07/27/13 | Flash Flood | 0 | 0 | $1,000,000 | $0 |
| Hickory | 07/27/13 | Flash Flood | 0 | 0 | $3,200,000 | $0 |
| Hickory | 07/27/13 | Flood | 0 | 0 | $100,000 | $0 |
| Oyama | 07/27/13 | Flash Flood | 0 | 0 | $900,000 | $0 |
| *Subtotal Catawba* | *21 Events* | | *0* | *0* | *$10,501,000* | *$0* |
| **TOTAL UNIFOUR** | **132 Events** | | **3** | **0** | **$21,337,300** | **$1,500,000** |

*Source: National Climatic Data Center Storm Events Database; local reports provided through the HMPC.*

According to NCDC and the HMPC, 132 recorded instances of flooding conditions have affected the planning area since 1993, causing an estimated $21,337,300 in losses to property, $1,500,000 in losses to agricultural crops, 3 deaths, and 0 injuries.

**Table 4.10** provides a summary of this historical information by participating jurisdiction. It is important to note that many of the events attributed to the county are countywide or cover large portions of the county. The individual counts by jurisdiction are for those events that are only attributed to that one jurisdiction.

**Table 4.10: Summary of Historical Flood Occurrences by Participating Jurisdiction**

| Jurisdiction | Number of Occurrences | Deaths | Injuries | Reported Property Damage | Reported Crop Damage |
|---|---|---|---|---|---|
| **Alexander County (Unincorporated Area)** | 10 | 0 | 0 | $100,000 | $0 |
| Taylorsville | 0 | 0 | 0 | $0 | $0 |
| *Subtotal Alexander* | *10* | *0* | *0* | *$100,000* | *$0* |
| **Burke County (Unincorporated Area)** | 30 | 0 | 0 | $9,032,000 | $0 |
| Connelly Springs | 0 | 0 | 0 | $0 | $0 |
| Drexel | 1 | 0 | 0 | $0 | $0 |
| Glen Alpine | 1 | 0 | 0 | $60,000 | $0 |

| Jurisdiction | Number of Occurrences | Deaths | Injuries | Reported Property Damage | Reported Crop Damage |
|---|---|---|---|---|---|
| Hildebran | 1 | 0 | 0 | $0 | $0 |
| Morganton | 12 | 0 | 0 | $4,300 | $0 |
| Valdese | 0 | 0 | 0 | $0 | $0 |
| Rutherford College | 0 | 0 | 0 | $0 | $0 |
| *Subtotal Burke* | *45* | *0* | *0* | *$9,096,300* | *$0* |
| **Caldwell County (Unincorporated Area)** | 37 | 3 | 0 | $1,510,000 | $1,500,000 |
| Cajah's Mountain | 0 | 0 | 0 | $0 | $0 |
| Cedar Rock | 0 | 0 | 0 | $0 | $0 |
| Gamewell | 0 | 0 | 0 | $0 | $0 |
| Granite Falls | 0 | 0 | 0 | $0 | $0 |
| Hudson | 0 | 0 | 0 | $0 | $0 |
| Lenoir | 17 | 0 | 0 | $130,000 | $0 |
| Rhodhiss | 0 | 0 | 0 | $0 | $0 |
| Sawmills | 0 | 0 | 0 | $0 | $0 |
| *Subtotal Caldwell* | *54* | *3* | *0* | *$1,640,000* | *$1,500,000* |
| **Catawba County (Unincorporated Area)** | 6 | 0 | 0 | $1,060,000 | $0 |
| Brookford | 1 | 0 | 0 | $0 | $0 |
| Catawba | 0 | 0 | 0 | $0 | $0 |
| Claremont | 4 | 0 | 0 | $3,020,000 | $0 |
| Conover | 1 | 0 | 0 | $0 | $0 |
| Hickory | 5 | 0 | 0 | $6,360,000 | $0 |
| Long View | 3 | 0 | 0 | $11,000 | $0 |
| Maiden | 1 | 0 | 0 | $50,000 | $0 |
| Newton | 0 | 0 | 0 | $0 | $0 |
| *Subtotal Catawba* | *21* | *0* | *0* | *$10,501,000* | *$0* |
| **TOTAL UNIFOUR** | **130** | **3** | **0** | **$21,337,300** | **$1,500,000** |

*Source: National Climatic Data Center Storm Events Database*

**Table 5.2** in Section 5: *Capability Assessment* lists the number of insured losses and total claims payments for historical flood damages in each jurisdiction as recorded under the NFIP. **Table 4.11** below provides the NFIP entry date for each participating jurisdiction. As explained in subsection 4.3, the NFIP entry date for each jurisdiction was used to determine buildings that were built pre-FIRM and are therefore assumed to be at greater risk to the flood hazard.

**Table 4.11: NFIP Entry Dates**

| Jurisdiction | NFIP Entry Date |
|---|---|
| **Alexander County (Unincorporated Area)** | 02/01/91 |
| Taylorsville | 12/18/07 |
| **Burke County (Unincorporated Area)** | 06/17/91 |
| Connelly Springs | 09/05/07 |
| Drexel | 08/19/86 |
| Glen Alpine | 09/05/07 |
| Hildebran | 09/05/07 |
| Morganton | 02/19/87 |
| Valdese | 07/03/86 |
| Rutherford College | 09/05/07 |
| **Caldwell County (Unincorporated Area)** | 08/16/88 |
| Cajah's Mountain | 08/16/88 |
| Cedar Rock | 07/07/09 |
| Gamewell | 08/16/88 |
| Granite Falls | 08/16/88 |
| Hudson | 08/16/88 |
| Lenoir | 08/16/88 |
| Rhodhiss | 07/03/86 |
| Sawmills | 07/07/09 |
| **Catawba County (Unincorporated Area)** | 09/03/80 |
| Brookford | 12/18/79 |
| Catawba | 09/03/80 |
| Claremont | 09/05/07 |
| Conover | 09/03/80 |
| Hickory | 08/03/81 |
| Long View | 09/03/80 |
| Maiden | 09/03/80 |
| Newton | 09/03/80 |

*Source: Federal Emergency Management Agency Community Status Book Report: Communities Participating in the National Flood Program, August 2013*

### *Probability of Future Occurrences*

Based on the information provided above, it is assumed that the probability of future flood hazard occurrences in the planning area is highly likely.

## Flood Hazard Vulnerability

The following tables provide counts and values by jurisdiction relevant to flood hazard vulnerability in the Unifour Region.

### Table 4.12: Exposure to the Floodway

| Jurisdiction | Number of Developed Parcels At Risk | | Number of Undeveloped Parcels At Risk | | Number of Buildings At Risk | | Value of Buildings At Risk | Number of Pre-FIRM Buildings At Risk | | Population At Risk | | Elderly Population At Risk | | Children At Risk | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Num | Per | Num | Per | Num | Per | | Num | Per | Num | Per | Num | Per | Num | Per |
| **Alexander County (Unincorporated Area)** | **176** | **1.08%** | **91** | **1.43%** | **37** | **0.14%** | **$296,938** | **0** | **0.00%** | **70** | **0.20%** | **7** | **0.14%** | **2** | **0.10%** |
| Taylorsville | 0 | 0.00% | 0 | 0.00% | 0 | 0.00% | $0 | 0 | 0.00% | 0 | 0.00% | 0 | 0.00% | 0 | 0.00% |
| *Subtotal Alexander* | *176* | *1.01%* | *91* | *1.38%* | *37* | *0.13%* | *$296,938* | *0* | *0.00%* | *70* | *0.19%* | *7* | *0.12%* | *2* | *0.09%* |
| **Burke County (Unincorporated Area)** | **333** | **1.41%** | **304** | **1.77%** | **47** | **0.14%** | **$2,403,911** | **29** | **0.14%** | **253** | **0.42%** | **33** | **0.37%** | **4** | **0.13%** |
| Connelly Springs | 0 | 0.00% | 1 | 0.18% | 0 | 0.00% | $0 | 0 | 0.00% | 0 | 0.00% | 0 | 0.00% | 0 | 0.00% |
| Drexel | 8 | 1.18% | 2 | 1.06% | 1 | 0.13% | $69,072 | 1 | 0.16% | 5 | 0.27% | 1 | 0.25% | 0 | 0.00% |
| Glen Alpine | 5 | 0.78% | 10 | 3.26% | 1 | 0.14% | $0 | 0 | 0.00% | 12 | 0.79% | 2 | 0.78% | 0 | 0.00% |
| Hildebran | 13 | 1.61% | 5 | 1.90% | 0 | 0.00% | $0 | 0 | 0.00% | 3 | 0.15% | 0 | 0.00% | 0 | 0.00% |
| Morganton | 195 | 3.25% | 144 | 7.91% | 11 | 0.15% | $3,371,375 | 4 | 0.07% | 277 | 1.64% | 78 | 2.53% | 12 | 1.04% |
| Valdese | 48 | 2.63% | 48 | 4.90% | 9 | 0.43% | $1,173,766 | 4 | 0.25% | 39 | 0.87% | 5 | 0.56% | 0 | 0.00% |
| Rutherford College | 0 | 0.00% | 0 | 0.00% | 0 | 0.00% | $0 | 0 | 0.00% | 0 | 0.00% | 0 | 0.00% | 0 | 0.00% |
| *Subtotal Burke* | *602* | *1.73%* | *514* | *2.39%* | *69* | *0.15%* | *$7,018,124* | *38* | *0.12%* | *589* | *0.65%* | *119* | *0.83%* | *16* | *0.32%* |
| **Caldwell County (Unincorporated Area)** | **477** | **2.42%** | **335** | **3.15%** | **29** | **0.11%** | **$1,438,800** | **19** | **0.13%** | **295** | **0.68%** | **33** | **0.54%** | **8** | **0.35%** |
| Cajah's Mountain | 2 | 0.18% | 2 | 0.83% | 0 | 0.00% | $0 | 0 | 0.00% | 2 | 0.07% | 0 | 0.00% | 0 | 0.00% |
| Cedar Rock | 2 | 1.36% | 2 | 2.41% | 0 | 0.00% | $0 | 0 | 0.00% | 8 | 2.67% | 3 | 3.23% | 0 | 0.00% |
| Gamewell | 37 | 2.38% | 29 | 6.87% | 4 | 0.20% | $298,500 | 1 | 0.07% | 180 | 4.44% | 19 | 3.04% | 10 | 4.65% |
| Granite Falls | 13 | 0.68% | 22 | 3.15% | 0 | 0.00% | $0 | 0 | 0.00% | 4 | 0.08% | 1 | 0.15% | 0 | 0.00% |

| Jurisdiction | Number of Developed Parcels At Risk | | Number of Undeveloped Parcels At Risk | | Number of Buildings At Risk | | Value of Buildings At Risk | Number of Pre-FIRM Buildings At Risk | | Population At Risk | | Elderly Population At Risk | | Children At Risk | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Num | Per | Num | Per | Num | Per | | Num | Per | Num | Per | Num | Per | Num | Per |
| Hudson | 41 | 2.70% | 40 | 9.43% | 1 | 0.06% | $499,800 | 1 | 0.08% | 83 | 2.20% | 10 | 1.53% | 4 | 1.96% |
| Lenoir | 407 | 5.25% | 171 | 7.62% | 86 | 1.00% | $19,323,700 | 58 | 0.88% | 535 | 2.94% | 85 | 2.52% | 25 | 2.25% |
| Rhodhiss | 0 | 0.00% | 0 | 0.00% | 0 | 0.00% | $0 | 0 | 0.00% | 0 | 0.00% | 0 | 0.00% | 0 | 0.00% |
| Sawmills | 45 | 2.40% | 29 | 5.13% | 0 | 0.00% | $0 | 0 | 0.00% | 20 | 0.38% | 2 | 0.29% | 0 | 0.00% |
| *Subtotal Caldwell* | *1,024* | *2.84%* | *630* | *4.06%* | *120* | *0.26%* | *$21,560,800* | *79* | *0.28%* | *1,127* | *1.36%* | *153* | *1.19%* | *47* | *1.01%* |
| **Catawba County (Unincorporated Area)** | **782** | **2.04%** | **608** | **4.55%** | **44** | **0.08%** | **$9,856,600** | **11** | **0.05%** | **887** | **1.06%** | **96** | **0.86%** | **32** | **0.67%** |
| Brookford | 29 | 12.24% | 12 | 23.53% | 2 | 0.68% | $498,500 | 2 | 0.82% | 12 | 3.14% | 2 | 2.78% | 0 | 0.00% |
| Catawba | 38 | 9.69% | 18 | 10.17% | 2 | 0.43% | $0 | 1 | 0.30% | 24 | 3.98% | 4 | 3.08% | 1 | 3.70% |
| Claremont | 11 | 1.47% | 8 | 3.69% | 0 | 0.00% | $0 | 0 | 0.00% | 8 | 0.59% | 1 | 0.51% | 0 | 0.00% |
| Conover | 112 | 3.24% | 58 | 6.26% | 7 | 0.18% | $886,200 | 4 | 0.18% | 106 | 1.30% | 14 | 1.01% | 8 | 1.42% |
| Hickory | 516 | 3.52% | 257 | 7.57% | 43 | 0.26% | $13,596,100 | 29 | 0.30% | 403 | 1.01% | 40 | 0.70% | 21 | 0.77% |
| Long View | 50 | 2.24% | 24 | 5.16% | 4 | 0.15% | $3,212,275 | 3 | 0.15% | 33 | 0.68% | 4 | 0.52% | 2 | 0.58% |
| Maiden | 25 | 1.57% | 18 | 4.04% | 0 | 0.00% | $0 | 0 | 0.00% | 30 | 0.91% | 3 | 0.66% | 1 | 0.48% |
| Newton | 202 | 3.83% | 122 | 10.16% | 3 | 0.05% | $79,400 | 1 | 0.02% | 171 | 1.32% | 25 | 1.22% | 8 | 0.84% |
| *Subtotal Catawba* | *1,765* | *2.64%* | *1,125* | *5.56%* | *105* | *0.12%* | *$28,129,075* | *51* | *0.11%* | *1,674* | *1.08%* | *189* | *0.87%* | *73* | *0.75%* |
| **TOTAL UNIFOUR** | **3,567** | **2.30%** | **2,360** | **3.70%** | **331** | **0.16%** | **$57,004,937** | **168** | **0.14%** | **3,460** | **0.95%** | **468** | **0.86%** | **138** | **0.64%** |

*Source: GIS Analysis*

**Table 4.13: Exposure to the 1-Percent-Annual-Chance (100-year) Flood**

| Jurisdiction | Number of Developed Parcels At Risk | | Number of Undeveloped Parcels At Risk | | Number of Buildings At Risk | | Value of Buildings At Risk | Number of Pre-FIRM Buildings At Risk | | Population At Risk | | Elderly Population At Risk | | Children At Risk | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Num | Per | Num | Per | Num | Per[8] | | Num | Per[9] | Num | Per | Num | Per | Num | Per |
| **Alexander County (Unincorporated Area)** | **1,549** | **9.49%** | **657** | **10.31%** | **342** | **1.31%** | **$20,938,021** | **78** | **0.54%** | **863** | **2.46%** | **98** | **1.92%** | **28** | **1.36%** |
| Taylorsville | 49 | 4.67% | 7 | 3.10% | 10 | 0.76% | $1,333,202 | 10 | 0.84% | 31 | 1.48% | 16 | 3.05% | 0 | 0.00% |
| *Subtotal Alexander* | *1,598* | *9.20%* | *664* | *10.06%* | *352* | *1.28%* | *$22,271,223* | *88* | *0.56%* | *894* | *2.40%* | *114* | *2.03%* | *28* | *1.27%* |
| **Burke County (Unincorporated Area)** | **1,336** | **5.65%** | **1,566** | **9.13%** | **289** | **0.89%** | **$14,157,590** | **137** | **0.65%** | **1,950** | **3.27%** | **261** | **2.94%** | **73** | **2.37%** |
| Connelly Springs | 37 | 5.48% | 179 | 31.79% | 4 | 0.47% | $381,226 | 4 | 0.57% | 30 | 1.80% | 3 | 1.04% | 0 | 0.00% |
| Drexel | 6 | 0.89% | 6 | 3.17% | 1 | 0.13% | $0 | 0 | 0.00% | 8 | 0.43% | 1 | 0.25% | 0 | 0.00% |
| Glen Alpine | 8 | 1.25% | 4 | 1.30% | 1 | 0.14% | $54,634 | 1 | 0.15% | 6 | 0.40% | 1 | 0.39% | 0 | 0.00% |
| Hildebran | 7 | 0.87% | 8 | 3.04% | 0 | 0.00% | $0 | 0 | 0.00% | 8 | 0.40% | 3 | 0.75% | 0 | 0.00% |
| Morganton | 97 | 1.62% | 60 | 3.29% | 64 | 0.88% | $20,505,433 | 42 | 0.74% | 555 | 3.28% | 113 | 3.67% | 32 | 2.78% |
| Valdese | 40 | 2.19% | 181 | 18.47% | 18 | 0.87% | $2,176,381 | 8 | 0.49% | 110 | 2.45% | 16 | 1.78% | 2 | 0.75% |
| Rutherford College | 14 | 2.48% | 15 | 6.49% | 2 | 0.28% | $28,968 | 2 | 0.31% | 13 | 0.97% | 2 | 0.85% | 0 | 0.00% |
| *Subtotal Burke* | *1,545* | *4.43%* | *2,019* | *9.39%* | *379* | *0.83%* | *$37,304,232* | *194* | *0.61%* | *2,680* | *2.95%* | *400* | *2.77%* | *107* | *2.15%* |
| **Caldwell County (Unincorporated Area)** | **1,739** | **8.83%** | **1,161** | **10.91%** | **572** | **2.19%** | **$27,268,000** | **344** | **2.40%** | **1,232** | **2.83%** | **175** | **2.85%** | **35** | **1.55%** |
| Cajah's Mountain | 34 | 3.04% | 6 | 2.48% | 1 | 0.08% | $14,100 | 1 | 0.10% | 35 | 1.24% | 5 | 0.96% | 2 | 1.09% |
| Cedar Rock | 7 | 4.76% | 3 | 3.61% | 0 | 0.00% | $0 | 0 | 0.00% | 16 | 5.33% | 6 | 6.45% | 0 | 0.00% |
| Gamewell | 64 | 4.12% | 41 | 9.72% | 21 | 1.03% | $1,619,600 | 13 | 0.88% | 255 | 6.29% | 38 | 6.08% | 13 | 6.05% |
| Granite Falls | 67 | 3.51% | 84 | 12.02% | 8 | 0.40% | $1,336,900 | 4 | 0.33% | 58 | 1.23% | 6 | 0.90% | 5 | 1.51% |
| Hudson | 39 | 2.57% | 15 | 3.54% | 17 | 1.02% | $4,486,500 | 12 | 0.99% | 150 | 3.97% | 16 | 2.44% | 10 | 4.90% |

[8] Percent of total number of buildings in jurisdiction.
[9] Percent of total number of pre-FIRM buildings in jurisdiction.

| Jurisdiction | Number of Developed Parcels At Risk | | Number of Undeveloped Parcels At Risk | | Number of Buildings At Risk | | Value of Buildings At Risk | Number of Pre-FIRM Buildings At Risk | | Population At Risk | | Elderly Population At Risk | | Children At Risk | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Num | Per | Num | Per | Num | Per[8] | | Num | Per[9] | Num | Per | Num | Per | Num | Per |
| Lenoir | 374 | 4.82% | 112 | 4.99% | 308 | 3.58% | $52,797,800 | 241 | 3.65% | 822 | 4.51% | 114 | 3.38% | 44 | 3.97% |
| Rhodhiss | 19 | 4.34% | 29 | 15.59% | 12 | 2.49% | $967,694 | 5 | 1.50% | 29 | 2.71% | 3 | 2.01% | 1 | 1.49% |
| Sawmills | 95 | 5.06% | 49 | 8.67% | 11 | 0.42% | $664,300 | 8 | 0.40% | 93 | 1.77% | 4 | 0.57% | 2 | 0.66% |
| *Subtotal Caldwell* | *2,438* | *6.77%* | *1,500* | *9.67%* | *950* | *2.10%* | *$89,154,894* | *628* | *2.20%* | *2,690* | *3.24%* | *367* | *2.86%* | *112* | *2.41%* |
| **Catawba County (Unincorporated Area)** | **3,742** | **9.77%** | **1,360** | **10.18%** | **1,429** | **2.59%** | **$73,266,700** | **356** | **1.46%** | **2,080** | **2.49%** | **240** | **2.16%** | **67** | **1.39%** |
| Brookford | 8 | 3.38% | 3 | 5.88% | 5 | 1.69% | $681,700 | 8 | 3.27% | 11 | 2.88% | 2 | 2.78% | 0 | 0.00% |
| Catawba | 16 | 4.08% | 27 | 15.25% | 5 | 1.08% | $1,223,800 | 6 | 1.83% | 27 | 4.48% | 3 | 2.31% | 1 | 3.70% |
| Claremont | 9 | 1.20% | 18 | 8.29% | 4 | 0.49% | $501,200 | 4 | 0.53% | 9 | 0.67% | 1 | 0.51% | 0 | 0.00% |
| Conover | 58 | 1.68% | 23 | 2.48% | 40 | 1.01% | $5,807,600 | 23 | 1.04% | 193 | 2.36% | 15 | 1.08% | 12 | 2.13% |
| Hickory | 237 | 1.62% | 82 | 2.42% | 137 | 0.84% | $33,990,800 | 62 | 0.63% | 581 | 1.45% | 61 | 1.06% | 27 | 0.99% |
| Long View | 15 | 0.67% | 8 | 1.72% | 17 | 0.65% | $6,724,546 | 15 | 0.74% | 65 | 1.33% | 7 | 0.91% | 3 | 0.87% |
| Maiden | 47 | 2.95% | 24 | 5.39% | 15 | 0.77% | $9,986,900 | 8 | 0.62% | 50 | 1.51% | 4 | 0.88% | 3 | 1.44% |
| Newton | 98 | 1.86% | 49 | 4.08% | 54 | 0.85% | $5,098,700 | 29 | 0.65% | 267 | 2.06% | 35 | 1.70% | 12 | 1.26% |
| *Subtotal Catawba* | *4,230* | *6.32%* | *1,594* | *7.88%* | *1,706* | *1.93%* | *$137,281,946* | *511* | *1.11%* | *3,283* | *2.13%* | *368* | *1.69%* | *125* | *1.29%* |
| **TOTAL UNIFOUR** | **9,811** | **6.32%** | **5,777** | **9.05%** | **3,387** | **1.64%** | **$286,012,295** | **1,421** | **1.17%** | **9,547** | **2.61%** | **1,249** | **2.29%** | **372** | **1.73%** |

*Source: GIS Analysis*

**Table 4.14: Exposure to the 0.2-Percent-Annual-Chance (500-year) Flood**

| Jurisdiction | Number of Developed Parcels At Risk | | Number of Undeveloped Parcels At Risk | | Number of Buildings At Risk | | Value of Buildings At Risk | Number of Pre-FIRM Buildings At Risk | | Population At Risk | | Elderly Population At Risk | | Children At Risk | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Num | Per | Num | Per | Num | Per | | Num | Per | Num | Per | Num | Per | Num | Per |
| **Alexander County (Unincorporated Area)** | **6** | **0.04%** | **2** | **0.03%** | **9** | **0.03%** | **$525,231** | **3** | **0.02%** | **3** | **0.01%** | **0** | **0.00%** | **0** | **0.00%** |
| Taylorsville | 0 | 0.00% | 0 | 0.00% | 0 | 0.00% | $0 | 0 | 0.00% | 0 | 0.00% | 0 | 0.00% | 0 | 0.00% |
| *Subtotal Alexander* | *6* | *0.03%* | *2* | *0.03%* | *13* | *0.05%* | *$525,231* | *3* | *0.02%* | *3* | *0.01%* | *0* | *0.00%* | *0* | *0.00%* |
| **Burke County (Unincorporated Area)** | **28** | **0.12%** | **15** | **0.09%** | **36** | **0.12%** | **$3,098,295** | **23** | **0.11%** | **112** | **0.19%** | **17** | **0.19%** | **2** | **0.06%** |
| Connelly Springs | 0 | 0.00% | 0 | 0.00% | 0 | 0.00% | $0 | 0 | 0.00% | 0 | 0.00% | 0 | 0.00% | 0 | 0.00% |
| Drexel | 3 | 0.44% | 0 | 0.00% | 0 | 0.00% | $0 | 0 | 0.00% | 2 | 0.11% | 0 | 0.00% | 0 | 0.00% |
| Glen Alpine | 4 | 0.63% | 8 | 2.61% | 2 | 0.28% | $260,877 | 2 | 0.31% | 16 | 1.05% | 2 | 0.78% | 1 | 0.96% |
| Hildebran | 0 | 0.00% | 0 | 0.00% | 0 | 0.00% | $0 | 0 | 0.00% | 1 | 0.05% | 0 | 0.00% | 0 | 0.00% |
| Morganton | 81 | 1.35% | 40 | 2.20% | 95 | 1.27% | $27,840,170 | 50 | 0.88% | 110 | 0.65% | 13 | 0.42% | 6 | 0.52% |
| Valdese | 5 | 0.27% | 1 | 0.10% | 6 | 0.29% | $334,991 | 0 | 0.00% | 5 | 0.11% | 0 | 0.00% | 0 | 0.00% |
| Rutherford College | 0 | 0.00% | 0 | 0.00% | 0 | 0.00% | $0 | 0 | 0.00% | 0 | 0.00% | 0 | 0.00% | 0 | 0.00% |
| *Subtotal Burke* | *121* | *0.35%* | *64* | *0.30%* | *139* | *0.31%* | *$31,534,333* | *75* | *0.24%* | *246* | *0.27%* | *32* | *0.22%* | *9* | *0.18%* |
| **Caldwell County (Unincorporated Area)** | **84** | **0.43%** | **56** | **0.53%** | **124** | **0.47%** | **$7,322,000** | **102** | **0.71%** | **62** | **0.14%** | **6** | **0.10%** | **0** | **0.00%** |
| Cajah's Mountain | 0 | 0.00% | 0 | 0.00% | 0 | 0.00% | $0 | 0 | 0.00% | 0 | 0.00% | 0 | 0.00% | 0 | 0.00% |
| Cedar Rock | 2 | 1.36% | 0 | 0.00% | 0 | 0.00% | $0 | 0 | 0.00% | 0 | 0.00% | 0 | 0.00% | 0 | 0.00% |
| Gamewell | 20 | 1.29% | 2 | 0.47% | 25 | 1.22% | $3,229,500 | 17 | 1.15% | 29 | 0.72% | 1 | 0.16% | 0 | 0.00% |
| Granite Falls | 3 | 0.16% | 2 | 0.29% | 0 | 0.00% | $0 | 0 | 0.00% | 1 | 0.02% | 0 | 0.00% | 0 | 0.00% |
| Hudson | 8 | 0.53% | 7 | 1.65% | 6 | 0.36% | $7,484,200 | 3 | 0.25% | 17 | 0.45% | 0 | 0.00% | 0 | 0.00% |
| Lenoir | 107 | 1.38% | 34 | 1.51% | 123 | 1.43% | $170,744,400 | 90 | 1.36% | 191 | 1.05% | 14 | 0.42% | 5 | 0.45% |
| Rhodhiss | 0 | 0.00% | 0 | 0.00% | 0 | 0.00% | $0 | 0 | 0.00% | 0 | 0.00% | 0 | 0.00% | 0 | 0.00% |
| Sawmills | 2 | 0.11% | 0 | 0.00% | 1 | 0.04% | $0 | 0 | 0.00% | 0 | 0.00% | 0 | 0.00% | 0 | 0.00% |

| Jurisdiction | Number of Developed Parcels At Risk | | Number of Undeveloped Parcels At Risk | | Number of Buildings At Risk | | Value of Buildings At Risk | Number of Pre-FIRM Buildings At Risk | | Population At Risk | | Elderly Population At Risk | | Children At Risk | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Num | Per | Num | Per | Num | Per | | Num | Per | Num | Per | Num | Per | Num | Per |
| *Subtotal Caldwell* | *226* | *0.63%* | *101* | *0.65%* | *279* | *0.62%* | *$188,780,100* | *212* | *0.74%* | *300* | *0.36%* | *21* | *0.16%* | *5* | *0.11%* |
| **Catawba County (Unincorporated Area)** | **81** | **0.21%** | **32** | **0.24%** | **50** | **0.09%** | **$12,929,900** | **18** | **0.07%** | **177** | **0.21%** | **5** | **0.04%** | **1** | **0.02%** |
| Brookford | 5 | 2.11% | 0 | 0.00% | 3 | 1.02% | $210,500 | 3 | 1.22% | 2 | 0.52% | 0 | 0.00% | 0 | 0.00% |
| Catawba | 5 | 1.28% | 0 | 0.00% | 1 | 0.22% | $92,100 | 0 | 0.00% | 4 | 0.66% | 0 | 0.00% | 0 | 0.00% |
| Claremont | 2 | 0.27% | 3 | 1.38% | 1 | 0.12% | $629,400 | 1 | 0.13% | 2 | 0.15% | 0 | 0.00% | 0 | 0.00% |
| Conover | 10 | 0.29% | 6 | 0.65% | 9 | 0.23% | $1,237,100 | 4 | 0.18% | 21 | 0.26% | 1 | 0.07% | 0 | 0.00% |
| Hickory | 43 | 0.29% | 14 | 0.41% | 66 | 0.41% | $17,599,000 | 26 | 0.26% | 167 | 0.42% | 13 | 0.23% | 4 | 0.15% |
| Long View | 5 | 0.22% | 0 | 0.00% | 4 | 0.15% | $190,661 | 4 | 0.20% | 7 | 0.14% | 0 | 0.00% | 0 | 0.00% |
| Maiden | 0 | 0.00% | 1 | 0.22% | 1 | 0.05% | $14,400 | 0 | 0.00% | 1 | 0.03% | 0 | 0.00% | 0 | 0.00% |
| Newton | 22 | 0.42% | 13 | 1.08% | 26 | 0.41% | $2,377,800 | 18 | 0.40% | 40 | 0.31% | 1 | 0.05% | 1 | 0.10% |
| *Subtotal Catawba* | *173* | *0.26%* | *69* | *0.34%* | *161* | *0.18%* | *$35,280,861* | *74* | *0.16%* | *421* | *0.27%* | *20* | *0.09%* | *6* | *0.06%* |
| **TOTAL UNIFOUR** | **526** | **0.34%** | **236** | **0.37%** | **592** | **0.29%** | **$256,120,525** | **364** | **0.30%** | **970** | **0.27%** | **73** | **0.13%** | **20** | **0.09%** |

*Source: GIS Analysis*

**Table 4.15: Numbers of Critical Facilities Exposed to the Floodway**

| Jurisdiction | Day Care | EMS | EOCs | Fire Stations | Govt. Buildings | Hospitals | Police Stations | Schools | Senior Care | Shelters |
|---|---|---|---|---|---|---|---|---|---|---|
| **Alexander County (Unincorporated Area)** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** |
| Taylorsville | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| *Subtotal Alexander* | *0* | *0* | *0* | *0* | *0* | *0* | *0* | *0* | *0* | *0* |
| **Burke County (Unincorporated Area)** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** |
| Connelly Springs | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Drexel | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Glen Alpine | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Hildebran | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Morganton | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Valdese | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Rutherford College | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| *Subtotal Burke* | *0* | *0* | *0* | *0* | *0* | *0* | *0* | *0* | *0* | *0* |
| **Caldwell County (Unincorporated Area)** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** |
| Cajah's Mountain | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Cedar Rock | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Gamewell | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Granite Falls | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Hudson | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Lenoir | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Rhodhiss | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Sawmills | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| *Subtotal Caldwell* | *0* | *0* | *0* | *0* | *0* | *0* | *0* | *0* | *0* | *0* |
| **Catawba County (Unincorporated Area)** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** |
| Brookford | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Catawba | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Claremont | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Conover | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Hickory | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Long View | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Maiden | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Newton | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| *Subtotal Catawba* | *0* | *0* | *0* | *0* | *0* | *0* | *0* | *0* | *0* | *0* |
| **TOTAL UNIFOUR** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** |

*Source: GIS Analysis*

**Table 4.16: Numbers of Critical Facilities Exposed to the 1-Percent-Annual-Chance (100-year) Flood**

| Jurisdiction | Day Care | EMS | EOCs | Fire Stations | Govt. Buildings | Hospitals | Police Stations | Schools | Senior Care | Shelters |
|---|---|---|---|---|---|---|---|---|---|---|
| **Alexander County (Unincorporated Area)** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** |
| Taylorsville | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| *Subtotal Alexander* | *0* | *0* | *0* | *0* | *0* | *0* | *0* | *0* | *0* | *0* |
| **Burke County (Unincorporated Area)** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** |
| Connelly Springs | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Drexel | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Glen Alpine | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Hildebran | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Morganton | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Valdese | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Rutherford College | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| *Subtotal Burke* | *0* | *0* | *0* | *0* | *0* | *0* | *0* | *0* | *0* | *0* |
| **Caldwell County (Unincorporated Area)** | **1** | **0** | **0** | **0** | **0** | **0** | **0** | **1** | **0** | **1** |
| Cajah's Mountain | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Cedar Rock | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Gamewell | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Granite Falls | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Hudson | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Lenoir | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 |
| Rhodhiss | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Sawmills | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| *Subtotal Caldwell* | *1* | *0* | *0* | *1* | *1* | *0* | *0* | *1* | *0* | *1* |
| **Catawba County (Unincorporated Area)** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** |
| Brookford | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Catawba | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Claremont | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Conover | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Hickory | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Long View | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Maiden | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Newton | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| *Subtotal Catawba* | *0* | *0* | *0* | *0* | *0* | *0* | *0* | *0* | *0* | *1* |
| **TOTAL UNIFOUR** | **1** | **0** | **0** | **1** | **1** | **0** | **0** | **1** | **0** | **2** |

*Source: FEMA DFIRM data; critical facilities supplied by participating jurisdictions.*

**Table 4.17: Numbers of Critical Facilities Exposed to the 0.2-Percent-Annual-Chance (500-year) Flood**

| Jurisdiction | Day Care | EMS | EOCs | Fire Stations | Govt. Buildings | Hospitals | Police Stations | Schools | Senior Care | Shelters |
|---|---|---|---|---|---|---|---|---|---|---|
| **Alexander County (Unincorporated Area)** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** |
| Taylorsville | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| *Subtotal Alexander* | *0* | *0* | *0* | *0* | *0* | *0* | *0* | *0* | *0* | *0* |
| **Burke County (Unincorporated Area)** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** |
| Connelly Springs | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Drexel | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Glen Alpine | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Hildebran | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Morganton | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Valdese | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Rutherford College | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| *Subtotal Burke* | *0* | *0* | *0* | *0* | *0* | *0* | *0* | *0* | *0* | *0* |
| **Caldwell County (Unincorporated Area)** | **0** | **1** | **0** | **1** | **0** | **0** | **0** | **0** | **0** | **0** |
| Cajah's Mountain | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Cedar Rock | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Gamewell | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Granite Falls | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Hudson | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Lenoir | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Rhodhiss | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Sawmills | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| *Subtotal Caldwell* | *0* | *1* | *0* | *1* | *0* | *0* | *0* | *0* | *0* | *0* |
| **Catawba County (Unincorporated Area)** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** |
| Brookford | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Catawba | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Claremont | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Conover | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Hickory | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Long View | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Maiden | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Newton | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| *Subtotal Catawba* | *0* | *0* | *0* | *0* | *0* | *0* | *0* | *0* | *0* | *0* |
| **TOTAL UNIFOUR** | **0** | **1** | **0** | **1** | **0** | **0** | **0** | **0** | **0** | **0** |

*Source: FEMA DFIRM data; critical facilities supplied by participating jurisdictions.*

**Table 4.18: Numbers of High Potential Loss Properties Exposed to the Flood Hazard**

| Jurisdiction | Airports | | | Military Facilities | | | Hazardous Materials Sites | | | Other[10] | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | FW | 1% | 0.2% | FW | 1% | 0.2% | FW | 1% | 0.2 % | FW | 1% | 0.2% |
| **Alexander County (Unincorporated Area)** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** |
| Taylorsville | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| *Subtotal Alexander* | *0* | *0* | *0* | *0* | *0* | *0* | *0* | *0* | *0* | *0* | *0* | *0* |
| **Burke County (Unincorporated Area)** | **1** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** |
| Connelly Springs | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Drexel | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Glen Alpine | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Hildebran | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Morganton | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Valdese | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Rutherford College | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| *Subtotal Burke* | *1* | *0* | *0* | *0* | *0* | *0* | *0* | *0* | *0* | *0* | *0* | *0* |
| **Caldwell County (Unincorporated Area)** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** |
| Cajah's Mountain | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Cedar Rock | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Gamewell | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Granite Falls | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Hudson | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 |
| Lenoir | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 |
| Rhodhiss | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Sawmills | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 |
| *Subtotal Caldwell* | *0* | *0* | *0* | *0* | *0* | *0* | *0* | *3* | *0* | *0* | *1* | *0* |
| **Catawba County (Unincorporated Area)** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** |
| Brookford | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Catawba | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Claremont | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Conover | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Hickory | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Long View | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Maiden | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Newton | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| *Subtotal Catawba* | *0* | *0* | *0* | *0* | *1* | *0* | *0* | *0* | *0* | *0* | *0* | *0* |
| **TOTAL UNIFOUR** | **1** | **0** | **0** | **0** | **1** | **0** | **0** | **3** | **0** | **0** | **1** | **0** |

*Source: GIS analysis.*

[10] This category consists of a variety of facilities specified by participating jurisdictions.

**Table 4.19: Numbers of Historic Properties Exposed to the Flood Hazard**

| Jurisdiction | Districts | | | Buildings | | | Other | | |
|---|---|---|---|---|---|---|---|---|---|
| | FW | 1% | 0.2% | FW | 1% | 0.2% | FW | 1% | 0.2% |
| **Alexander County (Unincorporated Area)** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** |
| Taylorsville | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| *Subtotal Alexander* | *0* | *0* | *0* | *0* | *0* | *0* | *0* | *0* | *0* |
| **Burke County (Unincorporated Area)** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** |
| Connelly Springs | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Drexel | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Glen Alpine | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Hildebran | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Morganton | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| Valdese | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Rutherford College | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| *Subtotal Burke* | *1* | *0* | *0* | *0* | *0* | *0* | *1* | *0* | *0* |
| **Caldwell County (Unincorporated Area)** | **1** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** |
| Cajah's Mountain | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Cedar Rock | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Gamewell | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Granite Falls | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Hudson | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Lenoir | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Rhodhiss | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Sawmills | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| *Subtotal Caldwell* | *1* | *0* | *0* | *0* | *0* | *0* | *0* | *0* | *0* |
| **Catawba County (Unincorporated Area)** | **8** | **0** | **0** | **0** | **0** | **0** | **1** | **0** | **0** |
| Brookford | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Catawba | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Claremont | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Conover | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Hickory | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Long View | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Maiden | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Newton | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| *Subtotal Catawba* | *11* | *0* | *0* | *0* | *0* | *0* | *1* | *0* | *0* |
| **TOTAL UNIFOUR** | **13** | **0** | **0** | **0** | **0** | **0** | **2** | **0** | **0** |

*Source: Jurisdictions and National Register of Historic Places.*

**Table 4.20** provides a summary count by jurisdiction of Repetitive Loss (RL) properties identified by FEMA through the NFIP.

**Table 4.20: Numbers of Repetitive Loss (RL) Properties by Jurisdiction**

| Jurisdiction | Total Number of Properties | Total Number of Losses | Total Amount of Claims Payments |
|---|---|---|---|
| **Alexander County (Unincorporated Area)** | **0** | **0** | **0** |
| Taylorsville | 0 | 0 | 0 |
| *Subtotal Alexander* | *0* | *0* | *0* |
| **Burke County (Unincorporated Area)** | **0** | **0** | **0** |
| Connelly Springs | 0 | 0 | 0 |
| Drexel | 0 | 0 | 0 |
| Glen Alpine | 0 | 0 | 0 |
| Hildebran | 0 | 0 | 0 |
| Morganton | 0 | 0 | 0 |
| Valdese | 0 | 0 | 0 |
| Rutherford College | 0 | 0 | 0 |
| *Subtotal Burke* | *0* | *0* | *0* |
| **Caldwell County (Unincorporated Area)** | **1** | **3** | **$60,721** |
| Cajah's Mountain | 0 | 0 | 0 |
| Cedar Rock | 0 | 0 | 0 |
| Gamewell | 0 | 0 | 0 |
| Granite Falls | 0 | 0 | 0 |
| Hudson | 0 | 0 | 0 |
| Lenoir | 0 | 0 | 0 |
| Rhodhiss | 0 | 0 | 0 |
| Sawmills | 0 | 0 | 0 |
| *Subtotal Caldwell* | *1* | *3* | *$60,721* |
| **Catawba County (Unincorporated Area)** | **5** | **11** | **$126,858** |
| Brookford | 0 | 0 | 0 |
| Catawba | 0 | 0 | 0 |
| Claremont | 0 | 0 | 0 |
| Conover | 0 | 0 | 0 |
| Hickory | 1 | 3 | $14,926 |
| Long View | 0 | 0 | 0 |
| Maiden | 0 | 0 | 0 |
| Newton | 0 | 0 | 0 |
| *Subtotal Catawba* | *6* | *14* | *$141,784* |
| **TOTAL UNIFOUR** | **7** | **17** | **$202,505** |

*Source: North Carolina Emergency Management.*

## 4.5.1.2 Erosion

### Erosion Hazard Description

Erosion is the gradual breakdown and movement of land due to both physical and chemical processes of water, wind, and general meteorological conditions. Natural, or geologic, erosion has occurred since the Earth's formation and continues at a very slow and uniform rate each year.

There are two types of soil erosion: wind erosion and water erosion. Wind erosion can cause significant soil loss. Winds blowing across sparsely vegetated or disturbed land can pick up soil particles and carry them through the air, thus displacing them. Water erosion can occur over land or in streams and channels. Water erosion that takes place over land may result from raindrops, shallow sheets of water flowing off the land, or shallow surface flow, which becomes concentrated in low spots. Stream channel erosion may occur as the volume and velocity of water flow increases enough to cause movement of the streambed and bank soils.

An area's potential for erosion is determined by four factors: soil characteristics, vegetative cover, climate or rainfall, and topography. Soils composed of a large percentage of silt and fine sand are most susceptible to erosion. As the clay and organic content of these soils increases, the potential for erosion decreases. Well-drained and well-graded gravels and gravel-sand mixtures are the least likely to erode. Coarse gravel soils are highly permeable and have a good capacity for absorption, which can prevent or delay the amount of surface runoff. Vegetative cover can be very helpful in controlling erosion by shielding the soil surface from falling rain, absorbing water from the soil, and slowing the velocity of runoff. Runoff is also affected by the topography of the area including size, shape, and slope. The greater the slope length and gradient, the more potential an area has for erosion. Climate can affect the amount of runoff, especially the frequency, intensity, and duration of rainfall and storms. When rainstorms are frequent, intense, or of long duration, erosion risks are high. Seasonal changes in temperature and rainfall amounts define the period of highest erosion risk of the year.

During the past 20 years, the importance of erosion control has gained the increased attention of the public. Implementation of erosion control measures consistent with sound agricultural and construction operations is needed to minimize the adverse effects associated with harmful chemicals run-off due to wind or water events. The increase in government regulatory programs and public concern has resulted in a wide range of erosion control products, techniques, and analytical methodologies in the United States. The preferred method of erosion control in recent years has been the restoration of vegetation.

### Erosion Hazard Analysis

Erosion in many areas of central and western North Carolina is typically caused by flash flooding events. Unlike coastal areas, where the soil is composed mainly of fine-grained particles such as sand, soils in other parts of North Carolina have a much greater organic matter content.

#### *Location Within the Planning Area*

No data is currently available with which to map identified areas of erosion concern.

#### *Extent (Magnitude and Severity)*

No data is currently available with which to determine magnitudes or severity of erosion hazard areas within the Unifour Region.

### *Historical Occurrences*
No data is currently available to document historical erosion hazard occurrences.

### *Probability of Future Occurrences*
Erosion will likely remain a natural, dynamic, and continuous process in areas of the Unifour Region, and its probability of future occurrence is certain.

## Erosion Hazard Vulnerability
Based upon a lack of historical events, relevant GIS data, and any immediate threat to life or property, a detailed vulnerability assessment has not be conducted for this hazard.

## 4.5.1.3 Dam/Levee Failure

### Dam/Levee Failure Hazard Description

Dam/levee failure is the breakdown, collapse, or other failure of a dam or levee structure characterized by the uncontrolled release of impounded water that results in downstream flooding. In the event of a dam or levee failure, the energy of the water stored behind even a small structure is capable of causing loss of life and severe property damage if development exists downstream. There are varying degrees of failure, and an unexpected or unplanned breach is considered one type of failure. A breach is an opening through a dam or levee which drains the water impounded behind it. A controlled breach is a planned, constructed opening and not considered a failure event, while an uncontrolled breach is the unintentional discharge from the impounded water body and considered a failure.

Dam/levee failure can result from natural events, human-induced events, or a combination of the two. Natural occurrences that may cause dam or levee failure include hurricanes, floods, earthquakes, and landslides; human-induced actions may include the deterioration of the foundation or the materials used in construction. In recent years, dams have also received considerably more attention in the emergency management community as potential targets for terrorist acts.

Dam/levee failure presents a significant potential for disaster, in that significant loss of life and property would be expected in addition to the possible loss of power and water resources. The most common cause of failure is prolonged rainfall that produces flooding. Failures due to other natural events such as hurricanes, earthquakes, or landslides are significant because there is generally little or no advance warning. The best way to mitigate dam or levee failure is through the proper construction, inspection, maintenance, and operation of these structures, as well as maintaining and updating Emergency Action Plans (EAPs) for use in the event of a dam failure.

### Dam/Levee Failure Hazard Analysis

In Alexander County, many creeks empty into, or become part of, the Catawba River. Catawba River levels are controlled by dams and flood gates. Therefore, high water flooding in these areas is considered to be relatively unlikely. However, there is still a potential threat to flooding.

The most significant threat to Burke County is the impoundment of Lake James, consisting of earthen structures and two spillways that were constructed in 1919 and that impound a maximum 265,182 acre feet of water or a total of 86,422,813,800 gallons within Lake James. A dam failure at Lake James would pose a significant threat to persons and property within the inundation pathway through the entire county. Data provided by Duke Energy on a dam failure flood inundation pathway was entered as a layer onto the County GIS System to identify the properties and areas at risk should an event occur. In the event of a major dam failure at the Bridgewater site, 27,570 people living in 11,508 housing units would be impacted to some extent by inundation. Duke Energy is currently working to reinforce the dam structures and upgrade their construction standards. This process is expected to continue throughout the next 2-5 years.

The entire southern border of Caldwell County is traversed by the Catawba River. During the 1950s a series of dams was constructed along the Catawba River in an effort to harness hydroelectric power. The two specific lakes that border Caldwell County to the south are Lake Rhodhiss to the southwest and Lake Hickory to the southeast. The downstream dam of Lake Rhodhiss is of specific concern to the County. The dam containing Lake Hickory is located a number of miles downstream in Catawba County. Failure of the dam containing Lake Rhodhiss would almost certainly result in catastrophic damage to life and property within Caldwell County. Also of concern are Oxford Dam, which contains Lake Hickory and Lookout Shoals Dam, which contains Lake Lookout.

The Town of Maiden in Catawba County has expressed some concern over the structural integrity of the Maiden Water Plant Dam and has been coordinating with state agencies on possible remedies, including permanent removal. The Town also recently completed the preparation of an EAP for the dam.

***Location Within the Planning Area***

**Table 4.21** shows counts of high and intermediate hazard dams in each participating jurisdiction. In total there are 53 high hazard dams in the planning area and 36 intermediate hazard dams. **Figure 4.37** shows the locations of all state-regulated dams in and immediately around the planning area,

**Table 4.21: Counts of High Hazard and Intermediate Hazard Dams by Jurisdiction**

| Jurisdiction | High | Intermediate |
|---|---|---|
| **Alexander County (Unincorporated Area)** | **11** | **5** |
| Taylorsville | 0 | 1 |
| *Subtotal Alexander* | *11* | *6* |
| **Burke County (Unincorporated Area)** | **10** | **11** |
| Connelly Springs | 0 | 0 |
| Drexel | 0 | 0 |
| Glen Alpine | 0 | 0 |
| Hildebran | 0 | 0 |
| Morganton | 1 | 0 |
| Valdese | 0 | 0 |
| Rutherford College | 0 | 0 |
| *Subtotal Burke* | *11* | *11* |
| **Caldwell County (Unincorporated Area)** | **14** | **8** |
| Cajah's Mountain | 0 | 0 |
| Cedar Rock | 0 | 0 |
| Gamewell | 0 | 0 |
| Granite Falls | 1 | 0 |
| Hudson | 0 | 0 |
| Lenoir | 0 | 0 |
| Rhodhiss | 0 | 0 |
| Sawmills | 0 | 1 |
| *Subtotal Caldwell* | *15* | *9* |
| **Catawba County (Unincorporated Area)** | **12** | **9** |
| Brookford | 0 | 0 |
| Catawba | 0 | 0 |
| Claremont | 0 | 0 |
| Conover | 1 | 0 |
| Hickory | 1 | 1 |
| Long View | 0 | 0 |

| Jurisdiction | High | Intermediate |
|---|---|---|
| Maiden | 1 | 0 |
| Newton | 1 | 0 |
| *Subtotal Catawba* | *16* | *10* |
| **TOTAL UNIFOUR** | **53** | **36** |

*Source: North Carolina Dams Program, North Carolina Department of Environment and Natural Resources (NCDENR).*

### *Extent (Magnitude and Severity)*

Two factors influence the potential severity of a dam failure: the amount of water impounded, and the density, type, and value of development and infrastructure located downstream. The potential extent of dam failure may be classified according to their "hazard potential," meaning the probable damage that would occur *if* the structure failed, in terms of loss of human life and economic loss or environmental damage. The State of North Carolina classifies dam structures under its regulations according to hazard potential as described in **Table 4.22**. It is important to note that these classifications are not based on the adequacy or structural integrity of existing dam structures.

**Table 4.22: Classification of Hazard Potential for North Carolina Dams**

| Hazard Classification | Description | Quantitative Guidelines |
|---|---|---|
| Low | 1) Interruption of road service, low volume roads<br>2) Economic damage | 1) Less than 25 vehicles per day<br>2) Less than $30,000 |
| Intermediate | 1) Damage to highways, interruption of service<br>2) Economic damage | 1) 25 to less than 250 vehicles per day<br>2) $30,000 to less than $200,000 |
| High | 1) Probable loss of human life due to breached roadway or bridge on or below the dam<br>2) Economic damage | 1) Probable loss of 1 or more human lives<br>2) More than $200,000 |

*Source: North Carolina Dams Program, North Carolina Department of Environment and Natural Resources (NCDENR).*

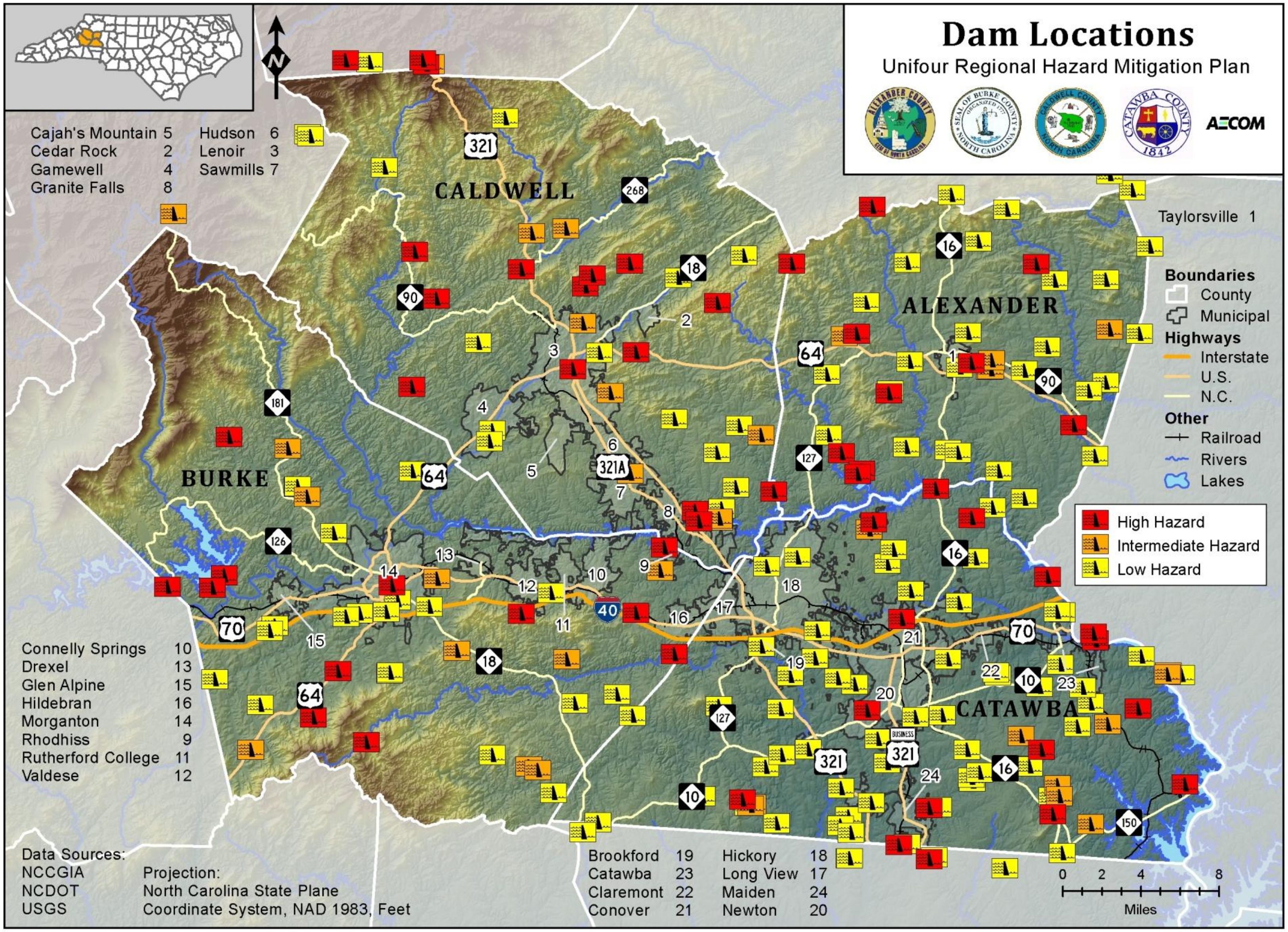
### *Historical Occurrences*

There are no records of historical dam failure occurrences in or affecting the planning area.

### *Probability of Future Occurrences*

The probability of the future occurrence of a failure at a large dam structure, especially one owned by Duke Energy Corporation, is considered to be unlikely. The probability of occurrence at smaller, privately owned dam structures is much more likely, however data is not currently available for these smaller structures, both in terms of point locations and mapped inundation areas. The HMPC does understand however that even if an event is considered to be highly unlikely, there could be high consequences should an event occur.

**Figure 4.37: Locations of State-Regulated Dams**



## Dam/Levee Failure Hazard Vulnerability

There is a fundamental limitation in the data available for vulnerability assessment for the dam/levee failure hazard in the planning area. Excellent data is available for GIS analysis, including point locations and mapped inundation areas, for the dams owned by Duke Energy Corporation. These include the Bridgewater Dam, Lookout Shoals Dam, Oxford Dam, and Rhodhiss Dam PMF Inundation Areas. These are large facilities that would undoubtedly have a profound impact on the planning area should a failure occur; however, such failures are considered to be extremely unlikely and the HMPC feels strongly that these are not the structures that are of concern to the Unifour Region. The dam structures that are of concern are smaller, privately owned, and unregulated dams for which no GIS data or inventories are currently available. These are the facilities that could and likely would cause the most damage and disruption should a more likely failure occur.

It has been determined therefore that presenting detailed risk assessment results for the Duke Energy facilities, even though data is available, would be misleading and unproductive for the purposes of mitigation planning. It has also been determined that any rudimentary calculations based on the point locations for the dams mapped by NCDENR (as shown in Figure 4.37) would also be potentially misleading if any type of buffer or proximity analysis was performed to estimate surrounding impacts should a failure occur.

Any mitigation actions developed for this hazard therefore should be based on addressing data limitations, education and awareness programs, and/or any jurisdiction-specific concerns that may be addressable through an appropriate mitigation project.

## 4.5.1.4 Drought/Extreme Heat

### Drought/Extreme Heat Hazard Description

Drought is a natural climatic condition caused by an extended period of limited rainfall beyond that which occurs naturally in a broad geographic area. High temperatures, high winds, and low humidity can worsen drought conditions, and can make areas more susceptible to wildfire. Human demands and actions can also hasten drought-related impacts.

Droughts are frequently classified as one of the following four types: meteorological, agricultural, hydrological, or socio-economic. Meteorological droughts are typically defined by the level of "dryness" when compared to an average, or normal amount of precipitation over a given period of time. Agricultural droughts relate common characteristics of drought to their specific agricultural-related impacts (when the amount of moisture in soil does not meet the needs of a particular crop). Hydrological drought is directly related to the effect of precipitation shortfalls on surface and groundwater supplies. Human factors, particularly changes in land use, can alter the hydrologic characteristics of a basin. Socio-economic drought is the result of water shortages that affect people and limit the ability to supply water-dependent products in the marketplace.

Drought conditions typically do not cause property damages or threaten lives, but rather drought effects are most directly felt by agricultural sectors. At times, drought may also cause community-wide impacts as a result of acute water shortages (regulatory use restrictions, drinking water supply, and salt water intrusion). The magnitude of such impacts correlates directly with local groundwater supplies, reservoir storage, and development densities. Drought conditions can also contribute to or exacerbate extreme heat concerns, particularly with regard to elderly populations.

### Drought/Extreme Heat Hazard Analysis

In recent years, all of western North Carolina has experienced severe to extreme drought conditions. The drying up of wells and the subsequent necessary replacement of wells is one indicator of the local severity of drought over the past 10 years.

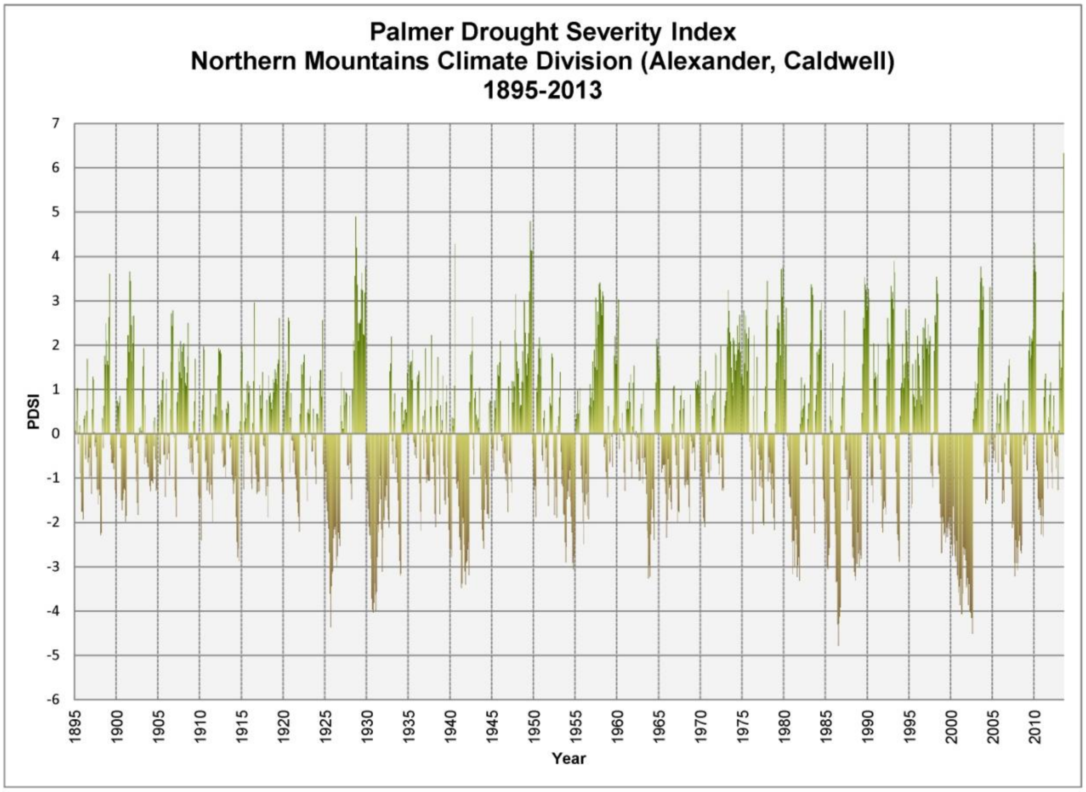
***Location Within the Planning Area***

Typically the National Weather Service looks at drought and extreme heat as episodes that impact a widespread forecast "zone," and therefore it is not common to pinpoint a specific location within a planning area that is more susceptible to these hazards than others. From this viewpoint, each county is considered uniformly at risk to drought and extreme heat. However, the most significant financial losses are likely to occur in areas that are primarily agricultural.

***Extent (Magnitude and Severity)***

As supported by the historical occurrences presented in the following subsection, the magnitude and severity of the drought/extreme heat hazard in the planning area is considered to be relatively mild. No deaths, injuries, property damages, or crop damages have been reported according to NCDC since 1998 so it is difficult to assign any specific severity rating to this hazard. **Figure 4.38** shows the Palmer Drought Severity Index (PDSI) for the Northern Mountains Climate Division for Alexander and Caldwell counties from 1895 through July 2013, which is an indication of periodic highs and lows for drought conditions. Similar graphs are available for Burke and Catawba counties.

**Figure 4.38: Palmer Drought Severity Index for the Northern Mountains Climate Division**




*Source: National Oceanic and Atmospheric Administration*

### *Historical Occurrences*

The following historical occurrences of drought ranging from 1998 to the present have been identified based on the NCDC Storm Events database (**Table 4.23**). It should be noted that only those historical occurrences listed in the NCDC database are shown here and that other, unrecorded or unreported events may have occurred within the planning area during this timeframe.

**Table 4.23: Historical Occurrences of Drought**

| Dates | Deaths | Injuries | Reported Property Damage | Reported Crop Damage |
|---|---|---|---|---|
| **ALEXANDER COUNTY** | | | | |
| 07/01/98-11/01/98 | 0 | 0 | $0 | $0 |
| 07/01/99-10/01/99 | 0 | 0 | $0 | $0 |
| 08/01/00-11/01/00 | 0 | 0 | $0 | $0 |
| 02/01/01-12/01/01 | 0 | 0 | $0 | $0 |
| 08/01/02 | 0 | 0 | $0 | $0 |
| 05/01/04 | 0 | 0 | $0 | $0 |
| 05/01/07-12/01/07 | 0 | 0 | $0 | $0 |
| 01/01/08-11/01/08 | 0 | 0 | $0 | $0 |
| *Subtotal Alexander* | 0 | 0 | $0 | $0 |

| Dates | Deaths | Injuries | Reported Property Damage | Reported Crop Damage |
|---|---|---|---|---|
| **BURKE COUNTY** | | | | |
| 07/01/98-11/01/98 | 0 | 0 | $0 | $0 |
| 07/01/99-10/01/99 | 0 | 0 | $0 | $0 |
| 08/01/00-11/01/00 | 0 | 0 | $0 | $0 |
| 02/01/01-12/01/01 | 0 | 0 | $0 | $0 |
| 08/01/02 | 0 | 0 | $0 | $0 |
| 05/01/04 | 0 | 0 | $0 | $0 |
| *Subtotal Burke* | 0 | 0 | $0 | $0 |
| **CALDWELL COUNTY** | | | | |
| 07/01/98-11/01/98 | 0 | 0 | $0 | $0 |
| 07/01/99-10/01/99 | 0 | 0 | $0 | $0 |
| 08/01/00-11/01/00 | 0 | 0 | $0 | $0 |
| 02/01/01-12/01/01 | 0 | 0 | $0 | $0 |
| 08/01/02 | 0 | 0 | $0 | $0 |
| 05/01/04 | 0 | 0 | $0 | $0 |
| *Subtotal Caldwell* | 0 | 0 | $0 | $0 |
| **CATAWBA COUNTY** | | | | |
| 07/01/98-11/01/98 | 0 | 0 | $0 | $0 |
| 07/01/99-10/01/99 | 0 | 0 | $0 | $0 |
| 08/01/00-11/01/00 | 0 | 0 | $0 | $0 |
| 02/01/01-12/01/01 | 0 | 0 | $0 | $0 |
| 08/01/02 | 0 | 0 | $0 | $0 |
| 05/01/04 | 0 | 0 | $0 | $0 |
| 05/01/07-12/01/07 | 0 | 0 | $0 | $0 |
| 01/01/08-11/01/08 | 0 | 0 | $0 | $0 |
| *Subtotal Catawba* | 0 | 0 | $0 | $0 |
| **TOTAL UNIFOUR** | **0** | **0** | **$0** | **$0** |

*Source: National Climatic Data Center Storm Events Database*

According to NCDC, eight recorded instances of prolonged drought conditions have affected the planning area since 1998, causing an estimated $0 in property damages, $0 in losses to agricultural crops, 0 deaths, and 0 injuries.

### *Probability of Future Occurrences*

Based on the historical occurrences presented in the previous subsection, it is likely that the Unifour Region will continue to experience periods of prolonged drought. It is considered to be unlikely however that the region will experience extreme conditions that would result in deaths, injuries, property damage, or significant crop damage.

## Drought/Extreme Heat Hazard Vulnerability

All of the inventoried assets in the Unifour Region are technically exposed to the drought/extreme heat hazard. However, it is not possible through GIS or anecdotal methods to determine specific numbers and values of individual assets that are more vulnerable to this hazard, especially in terms of the built environment. Further, all crops and other natural assets are considered to be equally at risk based on the data available and therefore no specific breakdown is possible. Any anticipated future damages or losses are expected to be minimal based on historical occurrences and other factors as described above.

## 4.5.2 Atmospheric Hazards (Severe Storms)

Atmospheric hazards generally have their own individual characteristics, geographic areas that may be affected, time of year they are most likely to occur, severity, and associated risk. Atmospheric hazards include thunderstorm, lightning, and hail; tornado; winter weather; and hurricane and tropical storm. In many cases, a natural hazard event involving atmospheric hazards involves more than one individual atmospheric hazard. For example, severe thunderstorms can produce lighting, hail, tornadoes, and damaging winds. Atmospheric hazards are presented separately from other categories of hazards but they may be interrelated. For example, severe thunderstorms can produce flooding, and other extreme weather events can lead to problems with dams and levees, cause landslides, exacerbate erosion, etc.

### 4.5.2.1 Thunderstorm, Lightning, and Hail

#### Thunderstorm, Lightning, and Hail Hazard Description

Thunderstorms are caused when air masses of varying temperatures meet. Rapidly rising warm moist air serves as the "engine" for thunderstorms. These storms can occur singularly, in lines, or in clusters. They can move through an area very quickly or linger for several hours. According to the National Weather Service, more than 100,000 thunderstorms occur each year, though only about 10% of these storms are classified as "severe." Although thunderstorms generally affect a small area when they occur, they are very dangerous because of their ability to generate tornadoes, hailstorms, strong winds, flash flooding, and damaging lightning. While thunderstorms can occur in all regions of the United States, they are most common in the central and southern states because atmospheric conditions in those regions are most ideal for generating these powerful storms.

Lightning is a discharge of electrical energy resulting from the buildup of positive and negative charges within a thunderstorm, creating a "bolt" when the buildup of charges becomes strong enough. This flash of light usually occurs within the clouds or between the clouds and the ground. A bolt of lightning can reach temperatures approaching 50,000 degrees Fahrenheit. Lightning rapidly heats the sky as it flashes, but the surrounding air cools following the bolt. This rapid heating and cooling of the surrounding air causes thunder. On average, 73 people are killed each year by lightning strikes in the United States.

Hail is a product of thunderstorms or intense showers. Hail is generally white and translucent, consisting of liquid or snow particles encased with layers of ice. Hail is formed within the high portion of a well-organized thunderstorm. When hailstones become too heavy to be caught in an updraft and carried back into the clouds of a thunderstorm (hailstones can be caught in numerous updrafts, adding a coating of ice to the original frozen droplets each time), they then fall as hail, and a hailstorm occurs.

#### Thunderstorm, Lightning, and Hail Hazard Analysis

Thunderstorms are common throughout the state of North Carolina, and have been known to occur during all calendar months.

***Location Within the Planning Area***

Thunderstorms, including lightning and hail, are widespread atmospheric disturbances that are not isolated to a specific geographic location. Therefore it is assumed that the entire planning area is exposed to these hazards. However, it is possible to map historic average annual cloud-to-ground lightning strikes and historic hail reporting by diameter as an indication of where in the Unifour Region these hazards have previously been observed and to what degree (**Figure 4.39**).

***Extent (Magnitude and Severity)***

Thunderstorms, lightning, and hail are known to be damaging hazard occurrences in the Unifour Region that can result in multiple injuries. There is currently no specific overall scale to rank the potential severity of severe events of this type but it is assumed that the magnitude and severity of future occurrences will be similar to that of historical occurrences.

The highest recorded thunderstorm winds in the planning area (according to NCDC) were 75 knots reported in Rutherford College in Burke County in 1997. The largest recorded size of a hailstone in the planning area (according to NCDC) is 4.5 inches reported in Morganton in Burke County (in 2000) and in Newton in Catawba County (in 1998).

There are some national studies that suggest that the risk of severe thunderstorms that produce torrential rain, damaging winds, large hail, and tornadoes may increase due to changes in the climate. However, there is currently no evidence to suggest at what rate this may occur within the Unifour Region.

***Historical Occurrences***

The following historical occurrences ranging from 1996 to the present have been identified based on the NCDC Storm Events database (**Table 4.24**). It should be noted that only those historical occurrences listed in the NCDC database are shown here and that other, unrecorded or unreported events may have occurred within the planning area during this timeframe.

**Table 4.24: Summary of Historical Thunderstorm, Lightning, and Hail Occurrences by Participating Jurisdiction (January 1996 through April 2013)**

| Jurisdiction | Number of Thunder-storm High Wind Events | Number of Lightning Events | Number of Hail Events | Deaths | Injuries | Reported Property Damage | Reported Crop Damage |
|---|---|---|---|---|---|---|---|
| **Alexander County (Unincorporated Area)** | 43 | 3 | 16 | 0 | 2 | $243,000 | $0 |
| Taylorsville | 23 | 3 | 20 | 0 | 0 | $1,100,000 | $0 |
| *Subtotal Alexander* | 66 | 6 | 36 | 0 | 2 | $1,343,000 | $0 |
| **Burke County (Unincorporated Area)** | 40 | 2 | 23 | 0 | 1 | $1,040,000 | $0 |
| Connelly Springs | 3 | 0 | 1 | 0 | 0 | $0 | $0 |
| Drexel | 2 | 0 | 5 | 0 | 0 | $0 | $0 |
| Glen Alpine | 6 | 2 | 14 | 0 | 1 | $50,000 | $0 |
| Hildebran | 1 | 1 | 4 | 0 | 1 | $0 | $0 |
| Morganton | 42 | 8 | 62 | 0 | 11 | $183,000 | $0 |

| Jurisdiction | Number of Thunder-storm High Wind Events | Number of Lightning Events | Number of Hail Events | Deaths | Injuries | Reported Property Damage | Reported Crop Damage |
|---|---|---|---|---|---|---|---|
| Valdese | 4 | 0 | 3 | 0 | 0 | $0 | $0 |
| Rutherford College | 3 | 1 | 2 | 0 | 1 | $25,000 | $0 |
| *Subtotal Burke* | 101 | 14 | 114 | 0 | 15 | $1,298,000 | $0 |
| **Caldwell County (Unincorporated Area)** | 32 | 2 | 41 | 0 | 0 | $100,000 | $0 |
| Cajah's Mountain | 0 | 0 | 0 | 0 | 0 | $0 | $0 |
| Cedar Rock | 0 | 0 | 0 | 0 | 0 | $0 | $0 |
| Gamewell | 1 | 0 | 3 | 0 | 0 | $0 | $0 |
| Granite Falls | 6 | 1 | 7 | 0 | 0 | $20,000 | $0 |
| Hudson | 2 | 1 | 0 | 0 | 0 | $100,000 | $0 |
| Lenoir | 29 | 4 | 27 | 0 | 0 | $137,000 | $0 |
| Rhodhiss | 1 | 0 | 0 | 0 | 0 | $0 | $0 |
| Sawmills | 3 | 0 | 0 | 0 | 0 | $3,000 | $0 |
| *Subtotal Caldwell* | 74 | 8 | 78 | 0 | 0 | $260,000 | $0 |
| **Catawba County (Unincorporated Area)** | 35 | 4 | 17 | 0 | 0 | $115,000 | $0 |
| Brookford | 0 | 0 | 3 | 0 | 0 | $0 | $0 |
| Catawba | 8 | 0 | 6 | 0 | 0 | $20,000 | $0 |
| Claremont | 13 | 2 | 8 | 0 | 1 | $85,000 | $0 |
| Conover | 8 | 2 | 9 | 0 | 0 | $11,000 | $0 |
| Hickory | 45 | 10 | 29 | 0 | 1 | $449,000 | $0 |
| Long View | 4 | 0 | 5 | 0 | 0 | $10,000 | $0 |
| Maiden | 8 | 0 | 14 | 0 | 0 | $1,000 | $0 |
| Newton | 19 | 2 | 16 | 0 | 0 | $10,057,000 | $0 |
| *Subtotal Catawba* | 140 | 20 | 107 | 0 | 2 | $10,748,000 | $0 |
| **TOTAL UNIFOUR** | **381** | **48** | **335** | **0** | **19** | **$13,649,000** | **$0** |

*Source: National Climatic Data Center Storm Events Database*

According to NCDC, 764 recorded instances of thunderstorm, lightning, and hail conditions have affected the planning area since 1996, causing an estimated $13,649,000 in property damages, $0 in crop damages, 0 deaths, and 19 reported injuries.

***Probability of Future Occurrences***

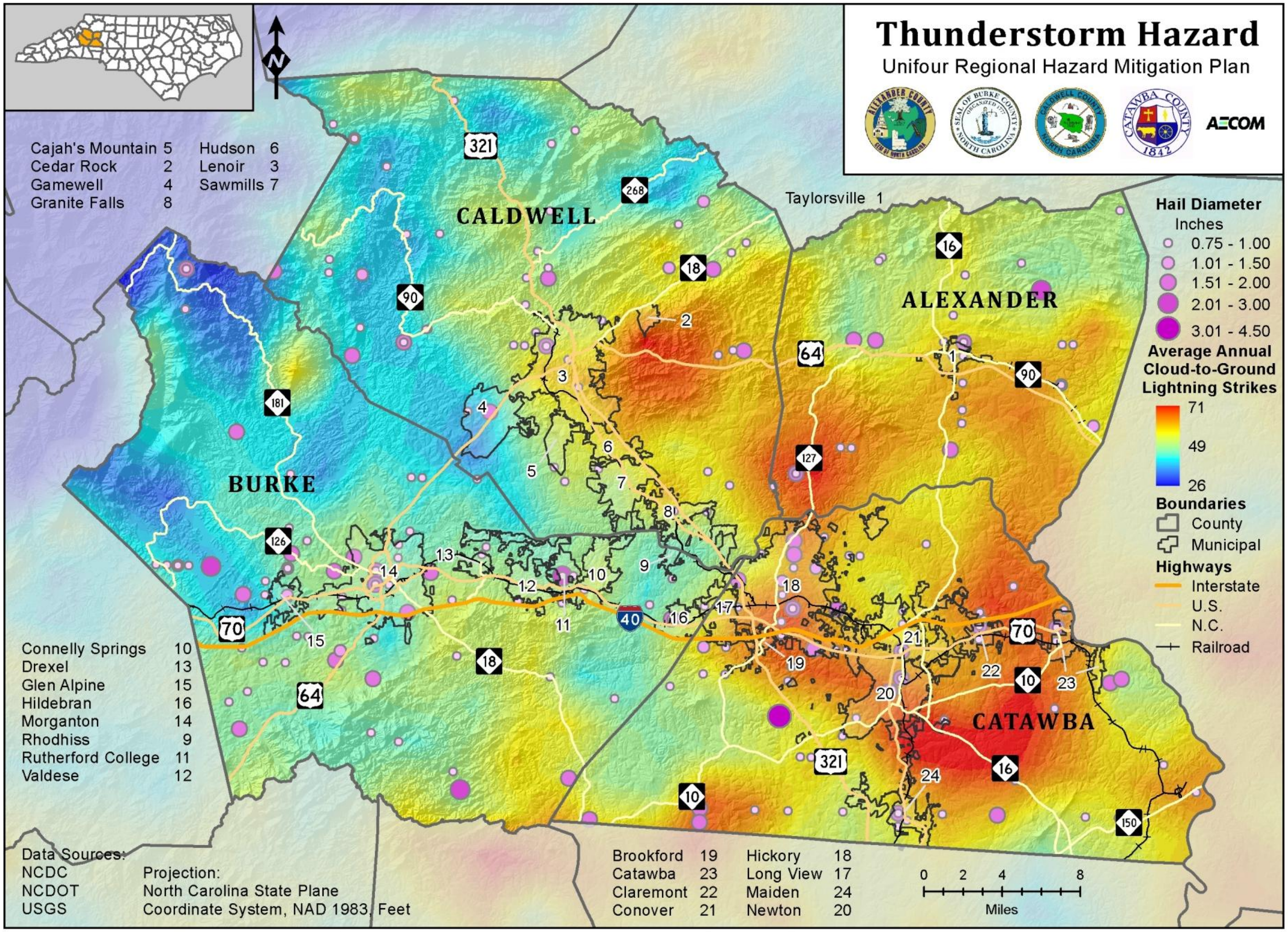
The probability of future occurrences of thunderstorm, lightning, and hail events is considered to be highly likely based on historical occurrences.

There are some national studies that suggest that the frequency of severe thunderstorms that produce torrential rain, damaging winds, large hail, and tornadoes may increase due to changes in the climate. However, there is currently no evidence to suggest at what rate this may occur within the Unifour Region.

### Thunderstorm, Lightning, and Hail Hazard Vulnerability

All of the inventoried assets in the Unifour Region are exposed to thunderstorm, lightning, and hail. Any specific vulnerability of individual assets depends greatly on individual design, building characteristics, and any existing mitigation measures currently in place. Such site-specific vulnerability determinations are outside the scope of this risk assessment but may be considered during future plan updates.

**Figure 4.39: Historic Lightning and Hail Observations in the Unifour Region**



### 4.5.2.2 Tornado

**Tornado Hazard Description**

A tornado is a violent windstorm characterized by a twisting, funnel-shaped cloud extending to the ground. Tornadoes are most often generated by thunderstorm activity (but sometimes result from hurricanes and other tropical storms) when cool, dry air intersects and overrides a layer of warm, moist air forcing the warm air to rise rapidly. The damage caused by a tornado is a result of the high wind velocity and wind-blown debris, also accompanied by lightning or large hail. According to the National Weather Service, tornado wind speeds normally range from 40 to more than 300 mph. The most violent tornadoes have rotating winds of 250 mph or more, and are capable of causing extreme destruction and turning normally harmless objects into deadly missiles.

The damage caused by tornadoes ranges from gale force to "incredible," depending on the intensity, size, and duration of the storm. Typically, tornadoes cause the greatest damage to structures of light construction such as residential homes (particularly mobile homes). **Table 4.25** shows the Enhanced Fujita Scale for Tornado Damage[11] which was implemented in 2007 to replace the original Fujita Scale and to more accurately measure tornado strength and associated damages.

**Table 4.25: Enhanced Fujita Scale for Tornado Damage**

| Storm Category | Damage Level | 3 Second Gust (mph) | Description of Damages |
|---|---|---|---|
| EF0 | Gale | 65–85 | Some damage to chimneys; breaks branches off trees; pushes over shallow-rooted trees; damages to sign boards. |
| EF1 | Weak | 86–110 | The lower limit is the beginning of hurricane wind speed; peels surface off roofs; mobile homes pushed off foundations or overturned; moving autos pushed off the roads; attached garages might be destroyed. |
| EF2 | Strong | 111–135 | Considerable damage. Roofs torn off frame houses; mobile homes demolished; boxcars pushed over; large trees snapped or uprooted; light object missiles generated. |
| EF3 | Severe | 136–165 | Roof and some walls torn off well-constructed houses; trains overturned; most trees in forest uprooted. |
| EF4 | Devastating | 166–200 | Well-constructed houses leveled; structures with weak foundations blown off some distance; cars thrown and large missiles generated. |
| EF5 | Incredible | 200+ | Strong frame houses lifted off foundations and carried considerable distances to disintegrate; automobile sized missiles fly through the air in excess of 100 meters; trees debarked; steel re-enforced concrete structures badly damaged. |

*Source: National Oceanic and Atmospheric Administration, Federal Emergency Management Agency*

[11] The Enhanced Fujita Scale for Tornado Damage can be accessed online at http://www.spc.noaa.gov/faq/tornado/ef-scale.html.

The original Fujita Tornado Damage Scale[12] is not shown here in order to avoid confusion. However, it is worth noting that tornado events that occurred prior to 2007 may be referenced by the original F-Scale numbers and associated damages may differ from those presented above.

Each year, an average of more than 800 tornadoes is reported nationwide, resulting in an average of 80 deaths and 1,500 injuries. They are more likely to occur during the months of March through May and can occur at any time of day, but are likely to form in the late afternoon and early evening. Most tornadoes are a few dozen yards wide and touch down briefly, but even small short-lived tornadoes can inflict tremendous damage. Highly destructive tornadoes might carve out a path over a mile wide and several miles long.

The tornadoes associated with tropical cyclones are most frequent in September and October when the incidence of tropical storm systems is greatest. This type of tornado usually occurs around the perimeter of the storm, and most often to the right and ahead of the storm path or the storm center as it comes ashore. These tornadoes commonly occur as part of large outbreaks and generally move in an easterly direction.

## Tornado Hazard Analysis

When compared with other states, North Carolina ranks #22 in number of tornado events, #20 in tornado deaths, #17 in tornado injuries, and #21 in damages. These rankings are based upon data collected for all states and territories for tornado events between 1950 and 1994 (SPC, 2003). According to the State Climate Office of North Carolina, most (43%) of tornado occurrences in North Carolina are minimal (EF0) in intensity, followed by EF1 (37%).

### *Location Within the Planning Area*

Tornadoes are unpredictable manifestations and are not isolated to a specific geographic location. Therefore it is assumed that the entire planning area is exposed to this hazard. However, it is possible to map historic tornado point locations and damage paths as an indicator of where tornadoes are known to have occurred throughout the planning area (**Figure 4.40**).

### *Extent (Magnitude and Severity)*

Tornadoes of any magnitude and severity are possible within the planning area. Since 1951, the highest magnitude tornado to impact the Unifour Region has been an F4 on the Fujita Scale for Tornado Damage which has occurred on two separate occasions in two different counties in the planning area (see *Historical Occurrences* subsection below).

### *Historical Occurrences*

The following historical occurrences ranging from 1950 to the present have been identified based on the NCDC Storm Events database (**Table 4.26**). It should be noted that only those historical occurrences listed in the NCDC database are shown here and that other, unrecorded or unreported events may have occurred within the planning area during this timeframe.

[12] The original Fujita Tornado Damage Scale can be accessed online at http://www.spc.noaa.gov/faq/tornado/f-scale.html.

**Table 4.26: Historical Occurrences of Tornadoes**

| Location | Date | Magnitude | Deaths | Injuries | Reported Property Damage | Reported Crop Damage |
|---|---|---|---|---|---|---|
| **ALEXANDER COUNTY** | | | | | | |
| Alexander County | 03/10/92 | N/A | N/A | N/A | N/A | N/A |
| Hiddenite | 05/07/98 | F0 | 0 | 0 | $425,000 | $0 |
| Bethlehem | 05/07/98 | F1 | 0 | 0 | $450,000 | $0 |
| Taylorsville | 07/07/05 | F2 | 0 | 0 | $150,000 | $0 |
| All Healing Springs | 04/28/11 | EF1 | 0 | 0 | $0 | $0 |
| Paynes Store Road | 08/18/11 | EF0 | 0 | 0 | $500,000 | $0 |
| *Subtotal Alexander* | 6 Events | | 0 | 0 | $1,525,000 | $0 |
| **BURKE COUNTY** | | | | | | |
| Burke County | 04/03/74 | F1 | N/A | N/A | $25,000 | $0 |
| Burke County | 05/24/79 | F2 | N/A | N/A | $250,000 | $0 |
| Bridgewater | 05/24/00 | F0 | 0 | 0 | $50,000 | $0 |
| Morganton | 05/24/00 | F0 | 0 | 0 | $0 | $0 |
| Morganton | 05/11/08 | EF0 | 0 | 0 | $0 | $0 |
| Brindletown | 09/27/10 | EF1 | 0 | 0 | $400,000 | $0 |
| Burke Chapel | 01/11/12 | EF2 | 0 | 8 | $13,400,000 | $0 |
| *Subtotal Burke* | 7 Events | | 0 | 8 | $14,125,000 | $0 |
| **CALDWELL COUNTY** | | | | | | |
| Caldwell County | 05/27/73 | F1 | 0 | 0 | $25,000 | $0 |
| Caldwell County | 04/04/74 | F2 | 0 | 0 | $250,000 | $0 |
| Caldwell County | 07/09/77 | F0 | 0 | 0 | $25,000 | $0 |
| Caldwell County | 05/05/89 | F2 | 0 | 0 | $250,000 | $0 |
| Dudley Shoals | 08/16/94 | F0 | 0 | 0 | $50,000 | $0 |
| Dudley Shoals | 05/07/98 | F4 | 0 | 2 | $1,100,000 | $0 |
| Sawmills | 04/28/11 | EF1 | 0 | 1 | $0 | $0 |
| Rhodhiss | 01/11/12 | EF0 | 0 | 0 | $0 | $0 |
| *Subtotal Caldwell* | 8 Events | | 0 | 3 | $1,700,000 | $0 |
| **CATAWBA COUNTY** | | | | | | |
| Catawba County | 08/09/51 | F2 | 0 | 0 | $25,000 | $0 |
| Catawba County | 08/18/54 | F2 | 0 | 0 | $25,000 | $0 |
| Catawba County | 05/23/73 | F1 | 0 | 2 | $25,000 | $0 |
| Catawba County | 05/27/73 | F1 | 0 | 0 | $250,000 | $0 |
| Catawba County | 03/14/75 | F1 | 0 | 0 | $3,000 | $0 |
| Catawba County | 05/25/75 | F1 | 0 | 0 | $3,000 | $0 |
| Catawba County | 09/18/82 | F1 | 0 | 0 | $25,000 | $0 |
| Catawba County | 05/05/89 | F4 | 0 | 3 | $25,000,000 | $0 |
| Catawba County | 03/07/92 | F0 | 0 | 0 | $3,000 | $0 |
| Catawba County | 11/22/92 | F1 | 0 | 0 | $250,000 | $0 |
| Northeast Hickory | 08/16/94 | F2 | 0 | 1 | $500,000 | $0 |
| Hickory | 09/28/98 | F0 | 0 | 0 | $20,000 | $0 |

| Location | Date | Magnitude | Deaths | Injuries | Reported Property Damage | Reported Crop Damage |
|---|---|---|---|---|---|---|
| Plateau | 10/26/10 | EF0 | 0 | 0 | $0 | $0 |
| Claremont | 10/26/10 | EF2 | 0 | 0 | $6,610,000 | $0 |
| Terrell | 10/26/10 | EF0 | 0 | 0 | $0 | $0 |
| *Subtotal Catawba* | 15 Events | | 0 | 6 | $32,739,000 | $0 |
| **TOTAL UNIFOUR** | **36 Events** | | **0** | **17** | **$50,089,000** | **$0** |

*Source: National Climatic Data Center Storm Events Database*

According to the information provided in the preceding table, 36 recorded instances of tornadoes have affected the planning area since 1950, causing an estimated $50,089,000 in property damage, $0 in crop damages, 0 deaths, and 17 injuries. The highest magnitude tornado on record is an F4. The lowest magnitude tornado on record is an F0.

**Table 4.27** provides a summary of this historical information by participating jurisdiction.

**Table 4.27: Summary of Historical Tornado Occurrences by Jurisdiction**

| Jurisdiction | Number of Occurrences | Maximum Magnitude | Deaths | Injuries | Reported Property Damage | Reported Crop Damage |
|---|---|---|---|---|---|---|
| **Alexander County (Unincorporated Area)** | 5 | F1 | 0 | 0 | $1,375,000 | $0 |
| Taylorsville | 1 | F2 | 0 | 0 | $150,000 | $0 |
| *Subtotal Alexander* | 6 | F2 | 0 | 0 | $1,525,000 | $0 |
| **Burke County (Unincorporated Area)** | 5 | EF2 | 0 | 8 | $14,125,000 | $0 |
| Connelly Springs | 0 | N/A | 0 | 0 | $0 | $0 |
| Drexel | 0 | N/A | 0 | 0 | $0 | $0 |
| Glen Alpine | 0 | N/A | 0 | 0 | $0 | $0 |
| Hildebran | 0 | N/A | 0 | 0 | $0 | $0 |
| Morganton | 2 | EF0 | 0 | 0 | $0 | $0 |
| Valdese | 0 | N/A | 0 | 0 | $0 | $0 |
| Rutherford College | 0 | N/A | 0 | 0 | $0 | $0 |
| *Subtotal Burke* | 7 | EF2 | 0 | 8 | $14,125,000 | $0 |
| **Caldwell County (Unincorporated Area)** | 6 | F4 | 0 | 2 | $1,700,000 | |
| Cajah's Mountain | 0 | N/A | 0 | 0 | $0 | $0 |
| Cedar Rock | 0 | N/A | 0 | 0 | $0 | $0 |
| Gamewell | 0 | N/A | 0 | 0 | $0 | $0 |
| Granite Falls | 0 | N/A | 0 | 0 | $0 | $0 |
| Hudson | 0 | N/A | 0 | 0 | $0 | $0 |
| Lenoir | 0 | N/A | 0 | 0 | $0 | $0 |
| Rhodhiss | 1 | EF0 | 0 | 0 | $0 | $0 |
| Sawmills | 1 | EF1 | 0 | 1 | $0 | $0 |
| *Subtotal Caldwell* | 8 | F4 | 0 | 3 | $1,700,000 | $0 |

| Jurisdiction | Number of Occurrences | Maximum Magnitude | Deaths | Injuries | Reported Property Damage | Reported Crop Damage |
|---|---|---|---|---|---|---|
| **Catawba County (Unincorporated Area)** | 13 | F4 | 0 | 6 | $26,109,000 | $0 |
| Brookford | 0 | N/A | 0 | 0 | $0 | $0 |
| Catawba | 0 | N/A | 0 | 0 | $0 | $0 |
| Claremont | 1 | EF2 | 0 | 0 | $6,610,000 | $0 |
| Conover | 0 | N/A | 0 | 0 | $0 | $0 |
| Hickory | 1 | F0 | 0 | 0 | $20,000 | $0 |
| Long View | 0 | N/A | 0 | 0 | $0 | $0 |
| Maiden | 0 | N/A | 0 | 0 | $0 | $0 |
| Newton | 0 | N/A | 0 | 0 | $0 | $0 |
| *Subtotal Catawba* | 15 | F4 | 0 | 6 | $32,739,000 | $0 |
| **TOTAL UNIFOUR** | **36** | **F4** | **0** | **17** | **$50,089,000** | **$0** |

*Source: National Climatic Data Center Storm Events Database*

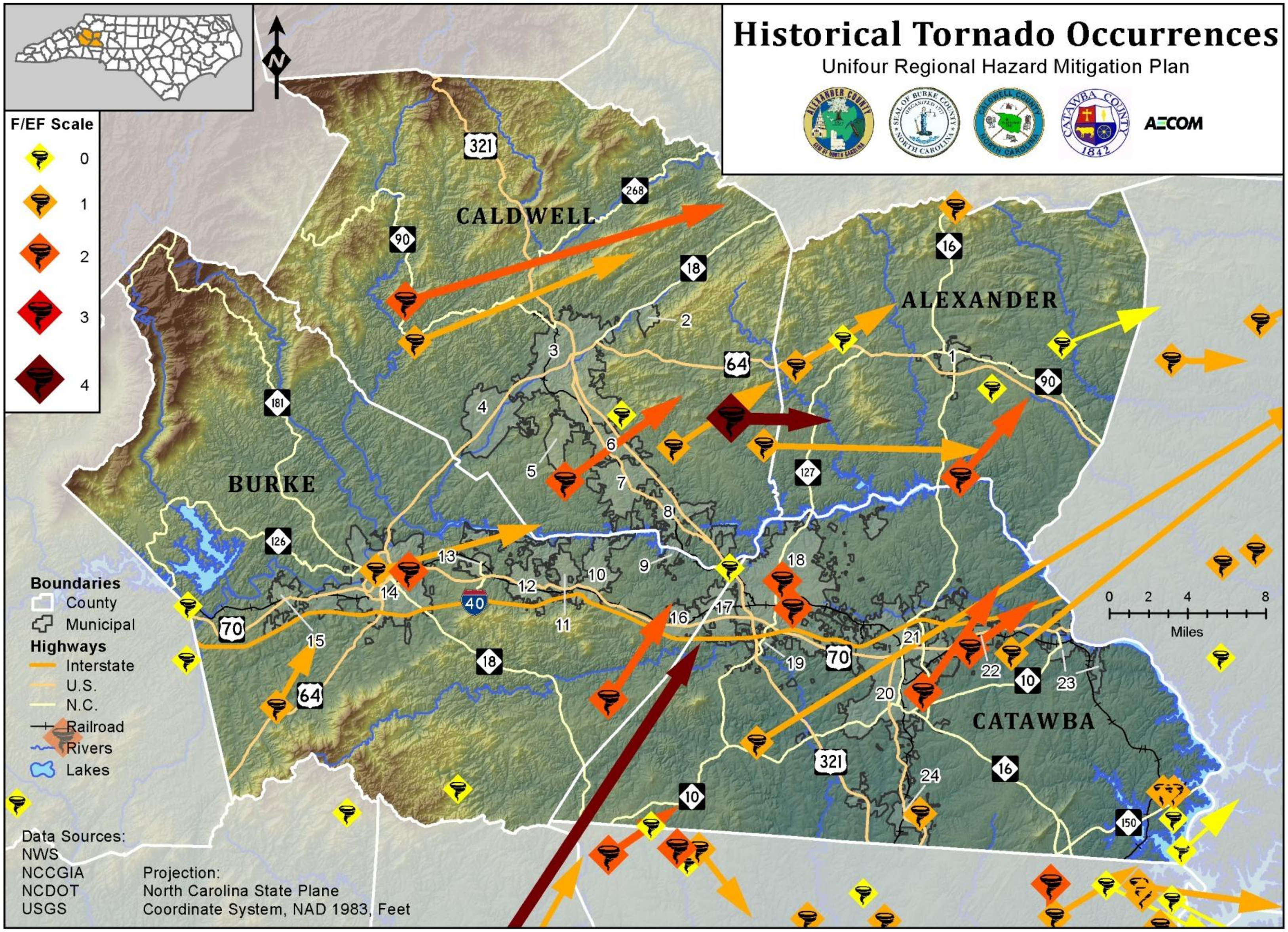
***Probability of Future Occurrences***

Future occurrences of potentially damaging tornadoes in the planning area are considered to be highly likely.

## Tornado Hazard Vulnerability

All of the inventoried assets in the Unifour Region are exposed to potential tornado activity. Any specific vulnerability of individual assets would depend greatly on individual design, building characteristics, and any existing mitigation measures currently in place. Such site-specific vulnerability determinations are outside the scope of this risk assessment but may be considered during future plan updates.

**Figure 4.40: Historic Tornado Point Locations and Damage Paths in the Unifour Region**



### 4.5.2.3 Winter Weather

#### Winter Weather Hazard Description

In general, winter weather events may include snow, sleet, freezing rain, or a mix of these wintry forms of precipitation, all of which may create locally hazardous conditions regardless of the magnitude of the overall event. Blizzards, the most dangerous of all winter storms, combine heavy snowfall, low temperatures, and winds of at least 35 mph, reducing visibility to only a few yards. Blizzards have been reported in a number of counties in western North Carolina. Ice storms occur when moisture falls and freezes immediately upon impact on trees, power lines, communication towers, structures, roads, and other hard surfaces. Ice storms can down trees, cause widespread power outages, damage property, and cause fatalities and injuries to human life.

#### Winter Weather Hazard Analysis

Nearly the entire continental United States is susceptible to severe winter weather events. Some winter storms may be large enough to affect several states, while others might affect limited, more localized areas. The degree of exposure typically depends on the normal expected severity of local winter weather. The Unifour Region is accustomed to severe winter weather conditions, and frequently receives winter weather during the winter months. Given the atmospheric nature of the hazard, the entire region has uniform exposure to a winter storm.

***Location Within the Planning Area***

Winter weather, including blizzards, frosts/freezes, heavy snow and sleet, are widespread atmospheric conditions that are not isolated to a specific geographic location. Therefore it is assumed that the entire planning area is exposed to this hazard. However, it is possible to map average annual snowfall and greatest one-day snowfall as an indicator of where severe conditions have been observed historically in the Unifour Region (**Figure 5.41** and **5.42**).

***Extent (Magnitude and Severity)***

There is currently no overall scale to rank the potential severity of severe winter weather events of this type but it is assumed that the magnitude and severity of future occurrences will be similar to that of historical occurrences.

***Historical Occurrences***

The following historical occurrences ranging from 1996 to the present have been identified based on the NCDC Storm Events database. NCDC presents winter weather hazards under multiple subcategories. **Table 4.28** shows occurrences of winter weather, blizzards, frost/freezes, heavy snow, and sleet. Because winter weather affects a large geographic area, this information is processed by NCDC in forecast “zones,” and therefore a municipal-level breakdown is not provided. Similarly, it is important to note that many of the events shown for one county are the same events that are counted for one of the other four counties in the planning area. For these reasons, totals are not provided in the table for the Unifour area as a whole as some double-counting would be inherent in the numbers. Also, only those historical occurrences listed in the NCDC database are shown here and other smaller, unrecorded, or unreported events may have occurred within the planning area during this timeframe.

**Figure 4.40: Average Annual Snowfall in the Unifour Region**

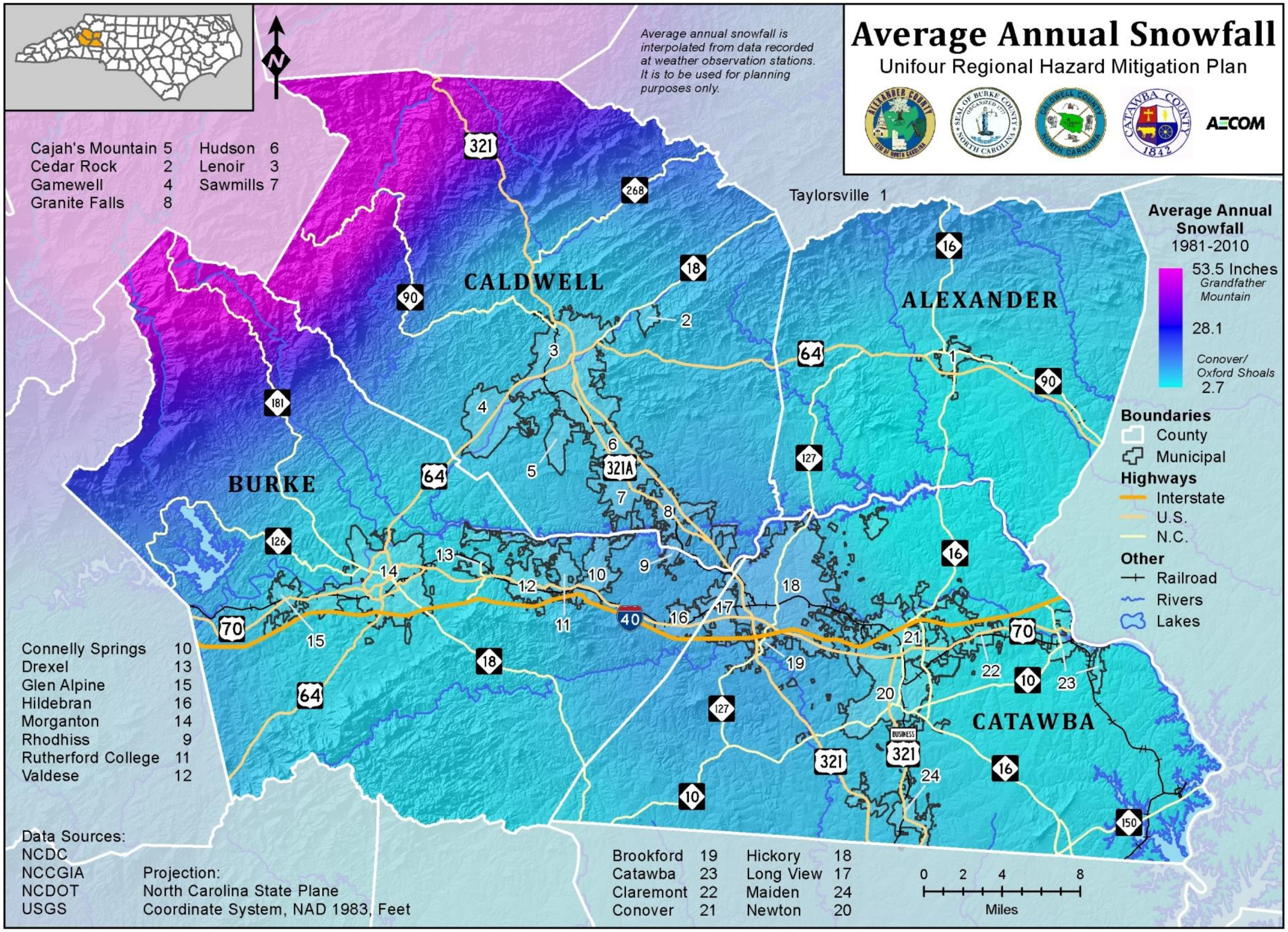


**Figure 4.41: Greatest One-Day Snowfall in the Unifour Region**

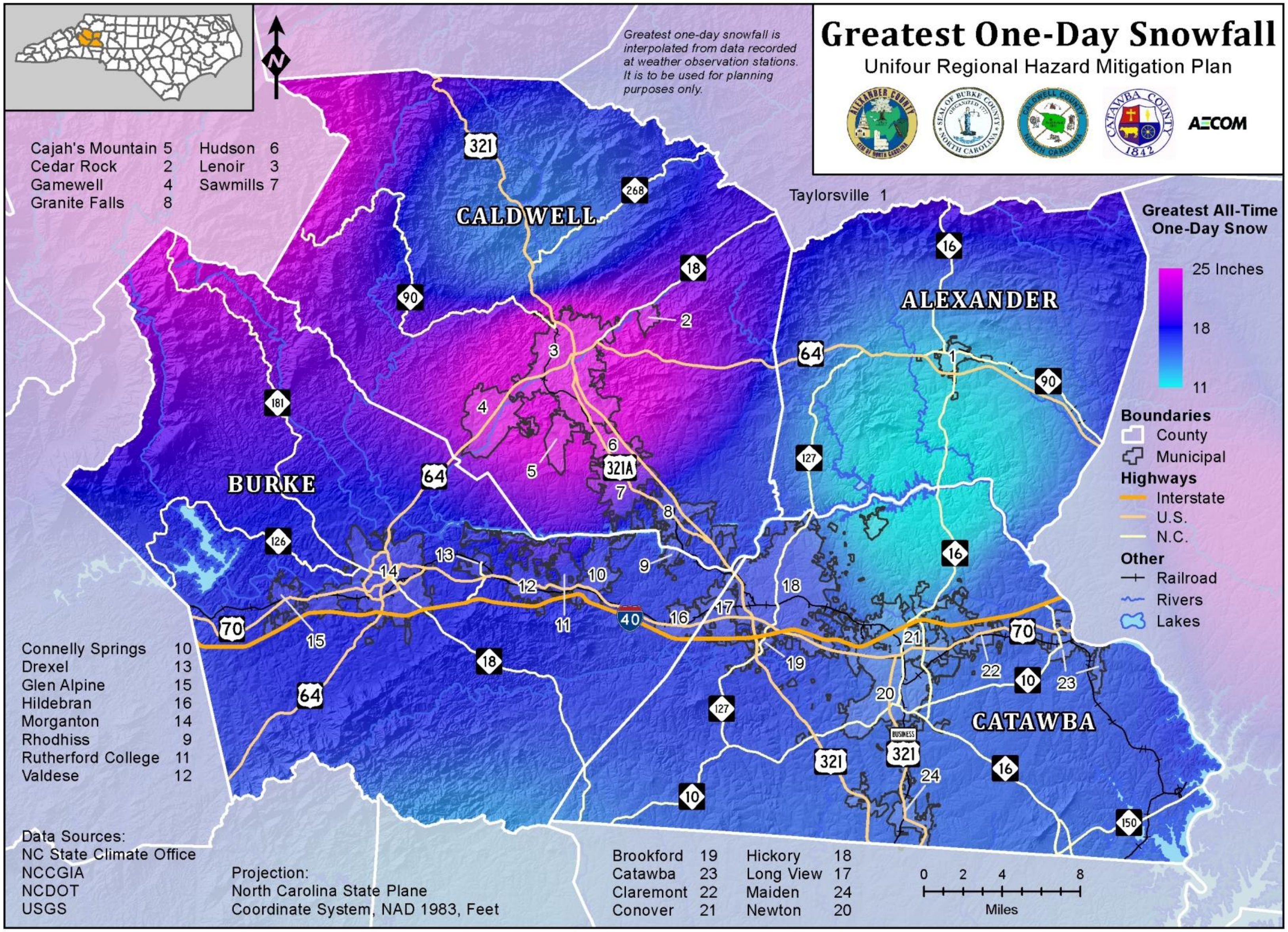


**Table 4.28: Summary of Winter Weather Occurrences by Participating Jurisdiction (January 1996 through April 2013)**

| Jurisdiction | Number of Winter Weather Events | Number of Blizzard Events | Number of Frost/ Freeze Events | Number of Heavy Snow Events | Number of Sleet Events | Deaths | Injuries | Reported Property Damage | Reported Crop Damage |
|---|---|---|---|---|---|---|---|---|---|
| Alexander County | 31 | 0 | 3 | 19 | 7 | 0 | 0 | $0 | $1,000,000 |
| Burke County | 26 | 0 | 1 | 23 | 6 | 0 | 0 | $2,000 | $0 |
| Caldwell County | 22 | 0 | 1 | 18 | 5 | 0 | 0 | $0 | $0 |
| Catawba County | 31 | 0 | 3 | 18 | 5 | 0 | 0 | $2,000 | $1,000,000 |

*Source: National Climatic Data Center Storm Events Database*

In summary, a total of at least 31 separate winter weather events, three frost/freeze events, 23 heavy snow events, and seven sleet events have affected the planning area since 1996, causing less than $5,000 in property damages and at least $1 million in crop damages (due to freezes). No deaths or injuries from winter weather have been reported.

***Probability of Future Occurrences***

It is assumed that the probably of future occurrences of winter weather events in the Unifour Region is highly likely and is anticipated to be similar in nature to known historical occurrences.

## Winter Weather Hazard Vulnerability

All of the inventoried assets in the Unifour Region are exposed to potential winter weather. Any specific vulnerabilities of individual assets would depend greatly on individual design, building characteristics (such as a flat roof), and any existing mitigation measures currently in place. Such site-specific vulnerability determinations are outside the scope of this risk assessment but may be considered during future plan updates.

## 4.5.2.4 Hurricane and Tropical Storm

### Hurricane/Tropical Storm Hazard Description

Hurricanes and tropical storms are classified as cyclones and are defined as any closed circulation developing around a low-pressure center in which the winds rotate counter-clockwise in the Northern Hemisphere (or clockwise in the Southern Hemisphere) and whose diameter averages 10 to 30 miles across. A tropical cyclone refers to any such circulation that develops over tropical waters. Tropical cyclones act as a "safety-valve," limiting the continued build-up of heat and energy in tropical regions by maintaining the atmospheric heat and moisture balance between the tropics and the pole-ward latitudes. The primary damaging forces associated with these storms are high-level sustained winds, heavy precipitation that causes inland flooding, and tornadoes. While mentioned here, each of these individual forces are more thoroughly addressed as separate hazards within this risk assessment (e.g., flood and tornado).

The key energy source for a tropical cyclone is the release of latent heat from the condensation of warm water. Their formation requires a low-pressure disturbance, warm sea surface temperature, rotational force from the spinning of the earth, and the absence of wind shear in the lowest 50,000 feet of the atmosphere. The majority of hurricanes and tropical storms form in the Atlantic Ocean, Caribbean Sea, and Gulf of Mexico during the official Atlantic hurricane season, which encompasses the months of June through November. The peak of the Atlantic hurricane season is in early to mid-September and the average number of storms that reach hurricane intensity per year in this basin is six.

As an incipient hurricane develops, barometric pressure (measured in millibars or inches) at its center falls and winds increase. If the atmospheric and oceanic conditions are favorable, it can intensify into a tropical depression. When maximum sustained winds reach or exceed 39 mph, the system is designated a tropical storm, given a name, and is closely monitored by the National Hurricane Center in Miami, Florida. When sustained winds reach or exceed 74 mph the storm is deemed a hurricane. Hurricane intensity is further classified by the Saffir-Simpson Scale (**Table 4.29**), which rates hurricane intensity in categories on a scale of 1 to 5, with category 5 being the most intense.

**Table 4.29: Saffir-Simpson Scale for Hurricanes**

| Category | Maximum Sustained Wind Speed (MPH) | Minimum Surface Pressure (Millibars) | Storm Surge (Feet) |
|---|---|---|---|
| 1 | 74–95 | Greater than 980 | 3–5 |
| 2 | 96–110 | 979–965 | 6–8 |
| 3 | 111–130 | 964–945 | 9–12 |
| 4 | 131–155 | 944–920 | 13–18 |
| 5 | 155 + | Less than 920 | 19+ |

*Source: National Oceanic and Atmospheric Administration*

The Saffir-Simpson Scale categorizes hurricane intensity linearly based upon maximum sustained winds, barometric pressure and storm surge potential, which are combined to estimate potential damage. Categories 3, 4, and 5 are classified as "major" hurricanes, and while hurricanes within this range comprise only 20% of total tropical cyclone landfalls, they account for over 70% of the damage in the United States. **Table 4.30** describes the damage that could be expected for each category of hurricane. Damage during hurricanes might also result from spawned tornadoes, storm surge, and inland flooding associated with heavy rainfall that usually accompanies these storms.

**Table 4.30: Hurricane Damage Classification**

| Category | Damage Level | Description of Damages |
|---|---|---|
| 1 | Minimal | No real damage to buildings. Damage primarily to unanchored mobile homes, shrubbery, and trees. Also, some coastal flooding and minor pier damage. |
| 2 | Moderate | Some roofing material, door and window damage. Considerable damage to vegetation, mobile homes, etc. Flooding damages piers and small craft in unprotected moorings might break their moorings. |
| 3 | Extensive | Some structural damage to small residences and utility buildings, with a minor amount of curtainwall failures. Mobile homes are destroyed. Flooding near the coast destroys smaller structures, with larger structures damaged by floating debris. Terrain might be flooded well inland. |
| 4 | Extreme | More extensive curtainwall failures with some complete roof structure failure on small residences. Major erosion of beach areas. Terrain might be flooded well inland. |
| 5 | Catastrophic | Complete roof failure on many residences and industrial buildings. Some complete building failures with small utility buildings blown over or away. Flooding causes major damage to lower floors of all structures near the shoreline. Massive evacuation of residential areas might be required. |

*Source: National Oceanic and Atmospheric Administration, Federal Emergency Management Agency*

## Hurricane/Tropical Storm Hazard Analysis

On average, North Carolina experiences a hurricane approximately once every two years. Substantial hurricane damage is typically most likely to be expected in the easternmost counties of the state; however, hurricane and tropical storm-force winds have significantly impacted areas far inland, including Alexander, Burke, Caldwell, and Catawba counties. In fact, 33 such storms have passed within 75 miles of the planning area since 1859, 10 of which crossed directly through the planning area (see **Figure 4.42** and **Table 4.31**). The total number of 33 includes two Category 1 hurricanes, 12 tropical storms, 12 tropical depressions, and 7 extra-tropical storms. Extra-tropical storms were included in the analysis due to the comparable wind speeds present with those events.

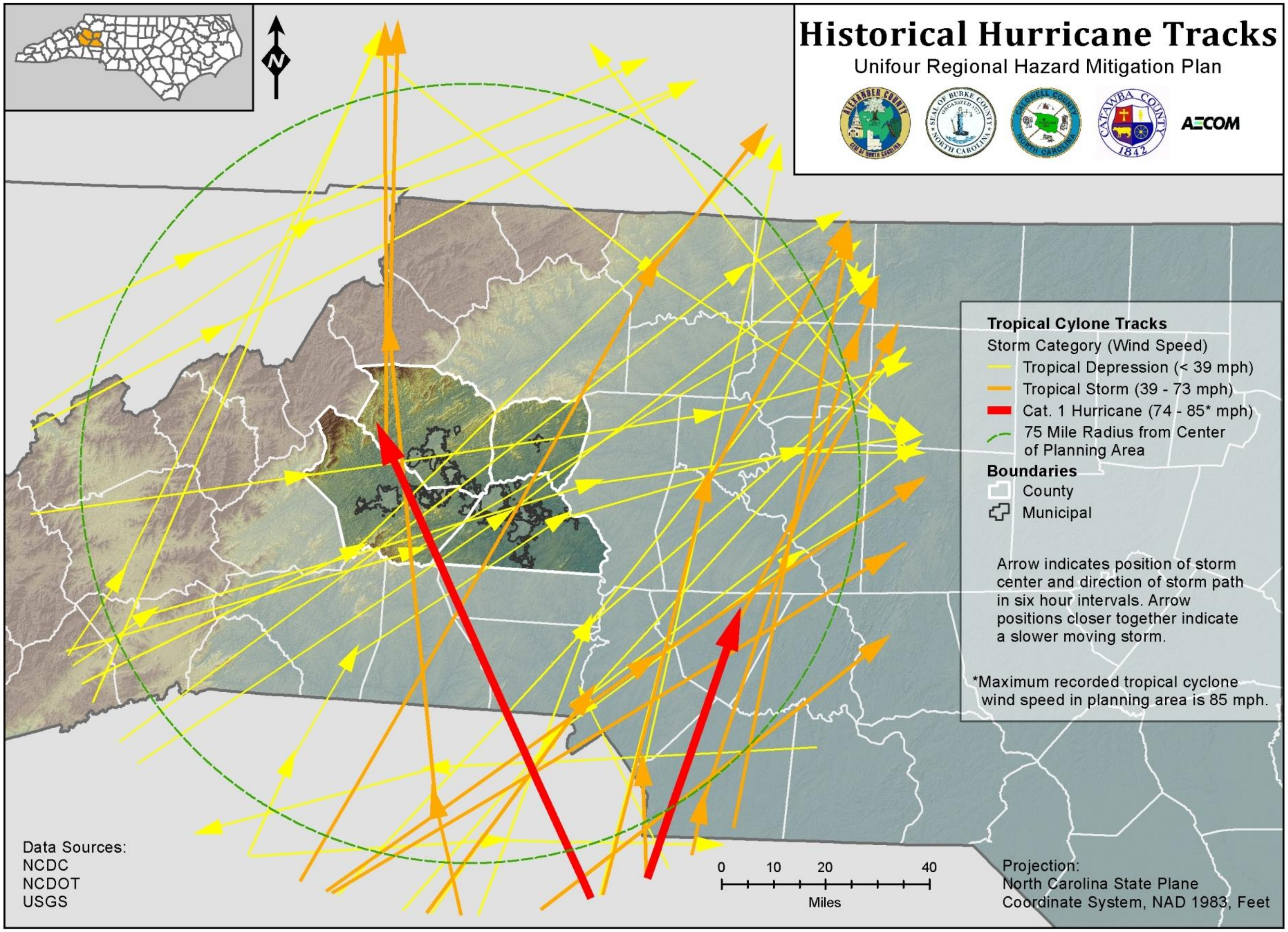
### *Location Within the Planning Area*

Hurricanes and tropical storms are widespread atmospheric disturbances that are not isolated to a specific geographic location within the planning area. Therefore it is assumed that the entire planning area is exposed to this hazard.

### *Extent (Magnitude and Severity)*

Hurricanes and tropical storms of any magnitude and severity are theoretically possible within the planning area, however major hurricanes (Category 3 and greater) are less likely to retain that classification as far inland as the Unifour Region. Since the 1850s, the greatest magnitude hurricane to impact the planning area has been a Category 1 hurricane in 1989 (Hurricane Hugo) (see *Historical Occurrences* section below). A Category 1 hurricane typically results in minimal damages, including damage primarily to unanchored mobile homes, shrubbery, and trees. Also, some coastal flooding and minor pier damage, etc. that is not applicable to the planning area.

**Figure 4.42: Historical Hurricane and Tropical Storm Tracks in the Unifour Region**



***Historical Occurrences***
**Table 4.31** lists the 34 hurricane and tropical storm paths that have crossed within a 75 statute mile radius of the mean center of the planning area from 1859 to 2011 (the data from the National Hurricane Center is only current through 2011).

**Table 4.31: Historical Occurrences of Hurricane Storm Paths Crossing within 75 Miles of the Planning Area**

| Name | Date | Magnitude | Maximum Recorded Wind Speed (mph) |
|---|---|---|---|
| Unnamed | 09/17/1859 | Tropical Storm | 45 |
| Unnamed | 09/11/1882 | Tropical Storm | 45 |
| Unnamed | 06/22/1886 | Tropical Storm | 45 |
| Unnamed | 09/24/1889 | Tropical Storm | 50 |
| Unnamed | 08/28/1893 | Category 1 Hurricane | 85 |
| Unnamed | 07/19/1901 | Tropical Depression | 35 |
| Unnamed | 10/11/1902 | Extra-tropical Storm | 35 |
| Unnamed | 10/11/1905 | Extra-tropical Storm | 25 |
| Unnamed | 09/23/1907 | Extra-tropical Storm | 35 |
| Unnamed | 08/30/1911 | Extra-tropical Storm | 30 |
| Unnamed | 09/04/1913 | Tropical Storm | 45 |
| Unnamed | 08/03/1915 | Tropical Depression | 35 |
| Unnamed | 09/23/1920 | Tropical Storm | 65 |
| Unnamed | 10/03/1927 | Tropical Storm | 45 |
| Unnamed | 08/11/1928 | Extra-tropical Storm | 30 |
| Unnamed | 08/18/1939 | Tropical Depression | 30 |
| Unnamed | 08/14/1940 | Extra-tropical Storm | 35 |
| Unnamed | 08/28/1949 | Tropical Storm | 45 |
| Able | 08/31/1952 | Tropical Storm | 50 |
| Gracie | 09/30/1959 | Tropical Storm | 70 |
| Cleo | 08/30/1964 | Tropical Depression | 30 |
| Abby | 06/08/1968 | Tropical Depression | 30 |
| Babe | 09/08/1977 | Tropical Depression | 30 |
| David | 09/05/1979 | Tropical Storm | 65 |
| Bob | 07/25/1985 | Tropical Storm | 65 |
| Danny | 08/18/1985 | Tropical Depression | 30 |
| Chris | 08/29/1988 | Tropical Depression | 30 |
| Hugo | 09/22/1989 | Category 1 Hurricane | 85 |
| Beryl | 08/17/1994 | Tropical Depression | 15 |
| Bill | 07/02/2003 | Tropical Depression | 25 |
| Ivan | 09/09/2004 | Tropical Depression | 25 |
| Jeanne | 09/13/2004 | Tropical Depression | 25 |
| Cindy | 07/03/2005 | Extra-tropical Storm | 20 |

*Source: NOAA National Hurricane Center*

Figure 4.42 is based on the mapped paths of the storm systems shown in Table 4.31.

***Probability of Future Occurrences***
Future occurrences of hurricanes and tropical storms are considered to be likely.

### Hurricane/Tropical Storm Hazard Vulnerability
All of the inventoried assets in the Unifour Region are exposed to potential hurricane and tropical storm events. Any specific vulnerability of individual assets would depend greatly on individual design, building characteristics, and any existing mitigation measures currently in place. Such site-specific vulnerability determinations are outside the scope of this risk assessment but may be considered during future plan updates.

## 4.5.3 Geologic Hazards

Geologic hazards include landslides, earthquakes, and sinkholes. As with the other hazard types discussed in this risk assessment, geologic hazards may occur as a result of or in combination with other hazards. For example, excessive rainfall can contribute to landslide occurrences, etc.

## 4.5.3.1 Landslide

### Landslide Hazard Description
A landslide is the downward and outward movement of slope-forming soil, rock, and vegetation, which is driven by gravity. Landslides may be triggered by both natural and human-caused changes in the environment, including heavy rain, rapid snow melt, steepening of slopes due to construction or erosion, earthquakes, volcanic eruptions, and changes in groundwater levels. Landslides occur when the force of gravity pulling down the slope exceeds the strength of the earth materials that comprise to hold it in place.

There are several types of landslides: rock falls, rock topple, slides, slumps, and debris flows. Rock falls are rapid movements of bedrock, which result in bouncing or rolling. A topple is a section or block of rock that rotates or tilts before falling to the slope below. Slides are movements of soil or rock along a distinct surface of rupture, which separates the slide material from the more stable underlying material. Slumps are landslides that typically occur on smaller slopes when loosely consolidated materials or rock layers move a short distance down a slope, typically in a rotational fashion. Debris flows, sometimes referred to as mudslides, mudflows, lahars, or debris avalanches, are fast-moving rivers of rock, earth, and other debris saturated with water.

Landslides are typically associated with periods of heavy rainfall or rapid snow melt and tend to worsen the effects of flooding that often accompanies these events. Slopes are also more likely to fail if vegetative cover is low and/or soil water content is high. In areas burned by forest and brush fires, a lower threshold of precipitation may initiate landslides. Some landslides move slowly and cause damage gradually, whereas others move so rapidly that they can destroy property and take lives suddenly and unexpectedly. Slopes greater than 10 degrees are more likely to slide, as are slopes where the height from the top of the slope to its toe is greater than 40 feet.

In the United States, it is estimated that landslides cause up to $2 billion in damages and from 25 to 50 deaths annually. Globally, landslides cause billions of dollars in damage and thousands of deaths and injuries each year.

## Landslide Hazard Analysis

### *Location Within the Planning Area*

**Figure 4.43** shows information developed by the United States Geological Survey (USGS) which depicts areas of landslide incidence and susceptibility. This information suggests that there is some significant potential risk that is not supported by any historical data or detailed landslide hazard mapping presently available for the planning area. In addition, **Figure 4.44** shows slope and average annual precipitation data for the Unifour Region.

**Figure 4.43: Landslide Susceptibility and Incidence Data for the Unifour Region**

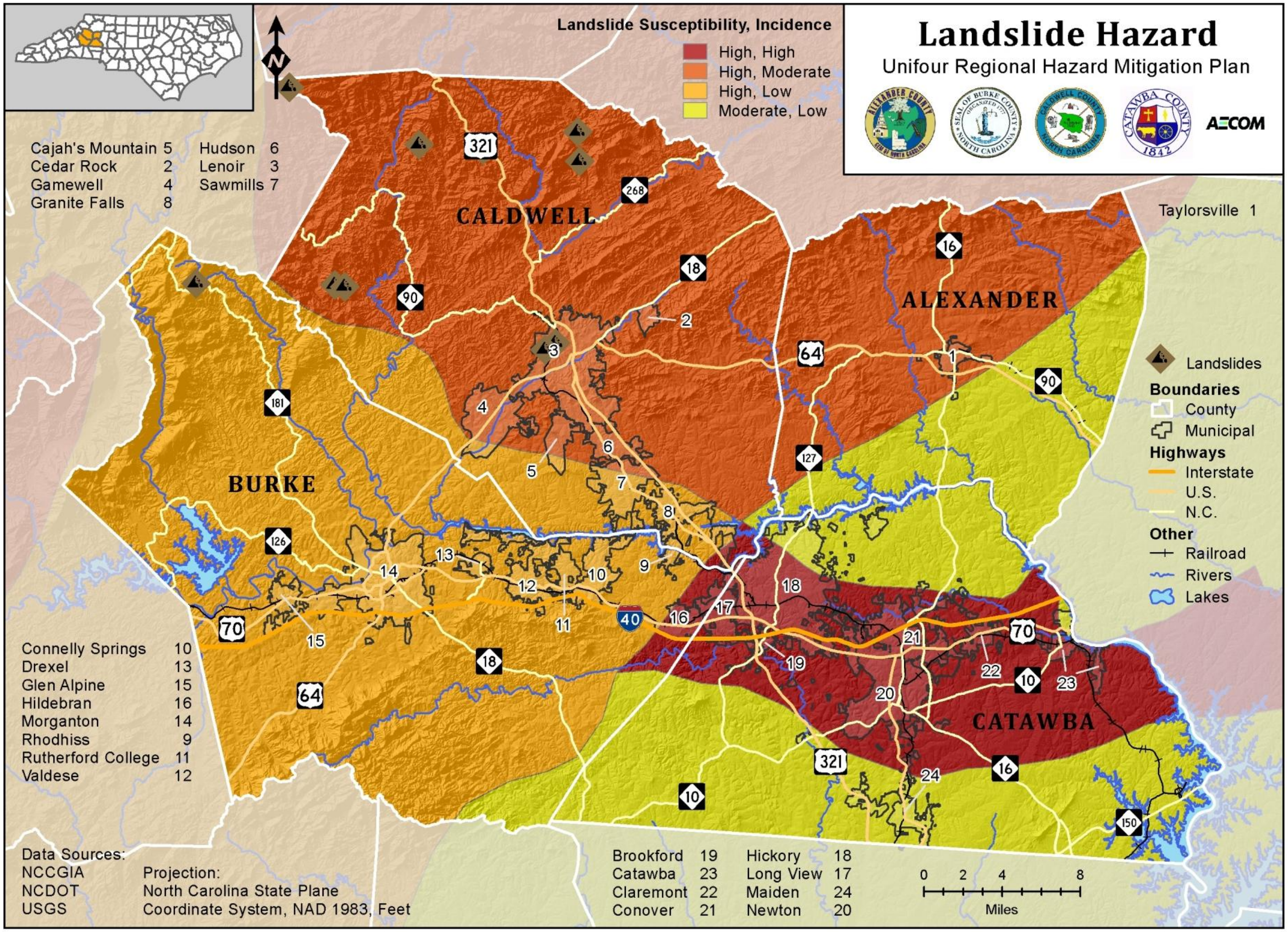
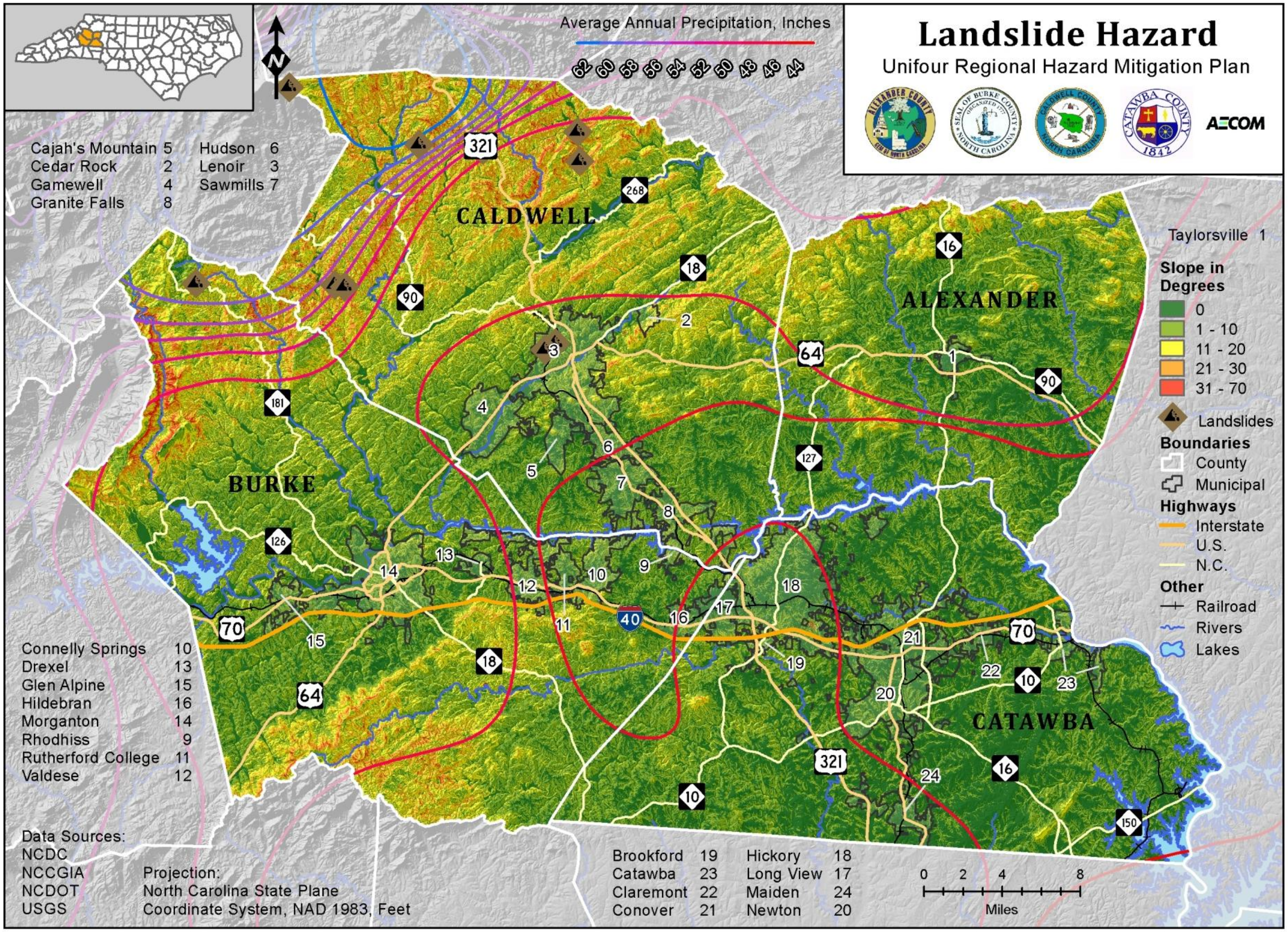


**Figure 4.43: Slope and Average Annual Precipitation Data for the Unifour Region**



### *Extent (Magnitude and Severity)*

The magnitude and severity of landslides can vary greatly depending on terrain and other highly localized factors. In addition, there is no overall severity rating scale for landslides that can be applied to the Unifour Region.

### *Historical Occurrences*

**Table 4.32** shows historical occurrences of landslides in the planning area.

**Table 4.32: Historical Occurrences of Landslides**

| Location | Date | Cause |
|---|---|---|
| **ALEXANDER COUNTY** | | |
| N/A | N/A | N/A |
| *Subtotal Alexander* | 0 Events | |
| **BURKE COUNTY** | | |
| N/A | N/A | N/A |
| *Subtotal Burke* | 0 Events | |
| **CALDWELL COUNTY** | | |
| U.S. Highway 321 6 miles south of Blowing Rock | 04/11/03 | Landslide carried away earth beneath about 8 feet of the highway's northbound shoulder |
| - | 09/04 | Result of heavy rains/flooding |
| - | 06/05 | Result of heavy rains/flooding |
| - | 07/13 | - |
| *Subtotal Caldwell* | 4 Events | |
| **CATAWBA COUNTY** | | |
| N/A | N/A | N/A |
| *Subtotal Catawba* | 0 Events | |
| **TOTAL UNIFOUR** | **4 Events** | |

## Landslide Hazard Vulnerability

Sufficient hazard information is not currently available with which to conduct a detailed vulnerability assessment. In addition, any specific vulnerability of individual assets would depend on individual design, building characteristics, and any existing mitigation measures currently in place. Such site-specific vulnerability determinations are outside the scope of this risk assessment but may be considered during future plan updates.

## 4.5.3.2 Earthquake

### Earthquake Hazard Description

An earthquake is the motion or trembling of the ground produced by sudden displacement of rock in the Earth's crust. Earthquakes result from crustal strain, volcanism, landslides, or the collapse of caverns. Earthquakes can affect hundreds of thousands of square miles, cause damage to property measured in the tens of billions of dollars, result in loss of life and injury to hundreds of thousands of persons; and disrupt the social and economic functioning of the affected area.

Most property damage and earthquake-related deaths are caused by the failure and collapse of structures due to ground shaking. The level of damage depends upon the amplitude and duration of the shaking, which are directly related to the earthquake size, distance from the fault, site, and regional geology. Other damaging earthquake effects include landslides, the down-slope movement of soil and rock (mountain regions and along hillsides), and liquefaction, in which ground soil loses the ability to resist shear and flows much like quick sand. In the case of liquefaction, anything relying on the substrata for support can shift, tilt, rupture, or collapse.

Most earthquakes are caused by the release of stresses accumulated as a result of the rupture of rocks along opposing fault planes in the Earth's outer crust. These fault planes are typically found along borders of the Earth's 10 tectonic plates. The areas of greatest tectonic instability occur at the perimeters of the slowly moving plates, as these locations are subjected to the greatest strains from plates traveling in opposite directions and at different speeds. Deformation along plate boundaries causes strain in the rock and the consequent buildup of stored energy. When the built-up stress exceeds the rocks' strength, a rupture occurs. The rock on both sides of the fracture is snapped, releasing the stored energy and producing seismic waves, generating an earthquake.

Earthquakes are measured in terms of their magnitude and intensity. Magnitude is measured using the Richter Scale, an open-ended logarithmic scale that describes the energy release of an earthquake through a measure of shock wave amplitude (**Table 4.33**). Each unit increase in magnitude on the Richter Scale corresponds to a 10-fold increase in wave amplitude, or a 32-fold increase in energy. Intensity is most commonly measured using the Modified Mercalli Intensity (MMI) Scale based on direct and indirect measurements of seismic effects. The scale levels are typically described using roman numerals, with an "I" corresponding to imperceptible (instrumental) events, "IV" corresponding to moderate (felt by people awake) events, to "XII" for catastrophic (total destruction) events. A detailed description of the Modified Mercalli Intensity Scale of earthquake intensity and its correspondence to the Richter Scale is given in **Table 4.34**.

**Table 4.33: Richter Scale**

| Richter Magnitudes | Earthquake Effects |
|---|---|
| Less than 3.5 | Generally not felt but recorded. |
| 3.5 to 5.4 | Often felt but rarely causes damage. |
| Under 6.0 | At most slight damage to well-designed buildings. Can cause major damage to poorly constructed buildings over small regions. |
| 6.1 to 6.9 | Can be destructive in areas up to about 100 kilometers across where people live. |
| 7.0 to 7.9 | Major earthquake. Can cause serious damage over larger areas. |
| 8 or greater | Great earthquake. Can cause serious damage in areas several hundred kilometers across. |

*Source: Federal Emergency Management Agency.*

**Table 4.34: Modified Mercalli Intensity Scale for Earthquakes**

| Scale | Intensity | Description of Effects | Corresponding Richter Scale Magnitude |
|---|---|---|---|
| I | Instrumental | Detected only on seismographs. | |
| II | Feeble | Some people feel it. | <4.2 |
| III | Slight | Felt by people resting; like a truck rumbling by. | |
| IV | Moderate | Felt by people walking. | |
| V | Slightly Strong | Sleepers awake; church bells ring. | <4.8 |
| VI | Strong | Trees sway; suspended objects swing, objects fall off shelves. | <5.4 |
| VII | Very Strong | Mild alarm; walls crack; plaster falls. | <6.1 |
| VIII | Destructive | Moving cars uncontrollable; masonry fractures, poorly constructed buildings damaged. | |
| IX | Ruinous | Some houses collapse; ground cracks; pipes break open. | <6.9 |
| X | Disastrous | Ground cracks profusely; many buildings destroyed; liquefaction and landslides widespread. | <7.3 |
| XI | Very Disastrous | Most buildings and bridges collapse; roads, railways, pipes and cables destroyed; general triggering of other hazards. | <8.1 |
| XII | Catastrophic | Total destruction; trees fall; ground rises and falls in waves. | >8.1 |

*Source: Federal Emergency Management Agency.*

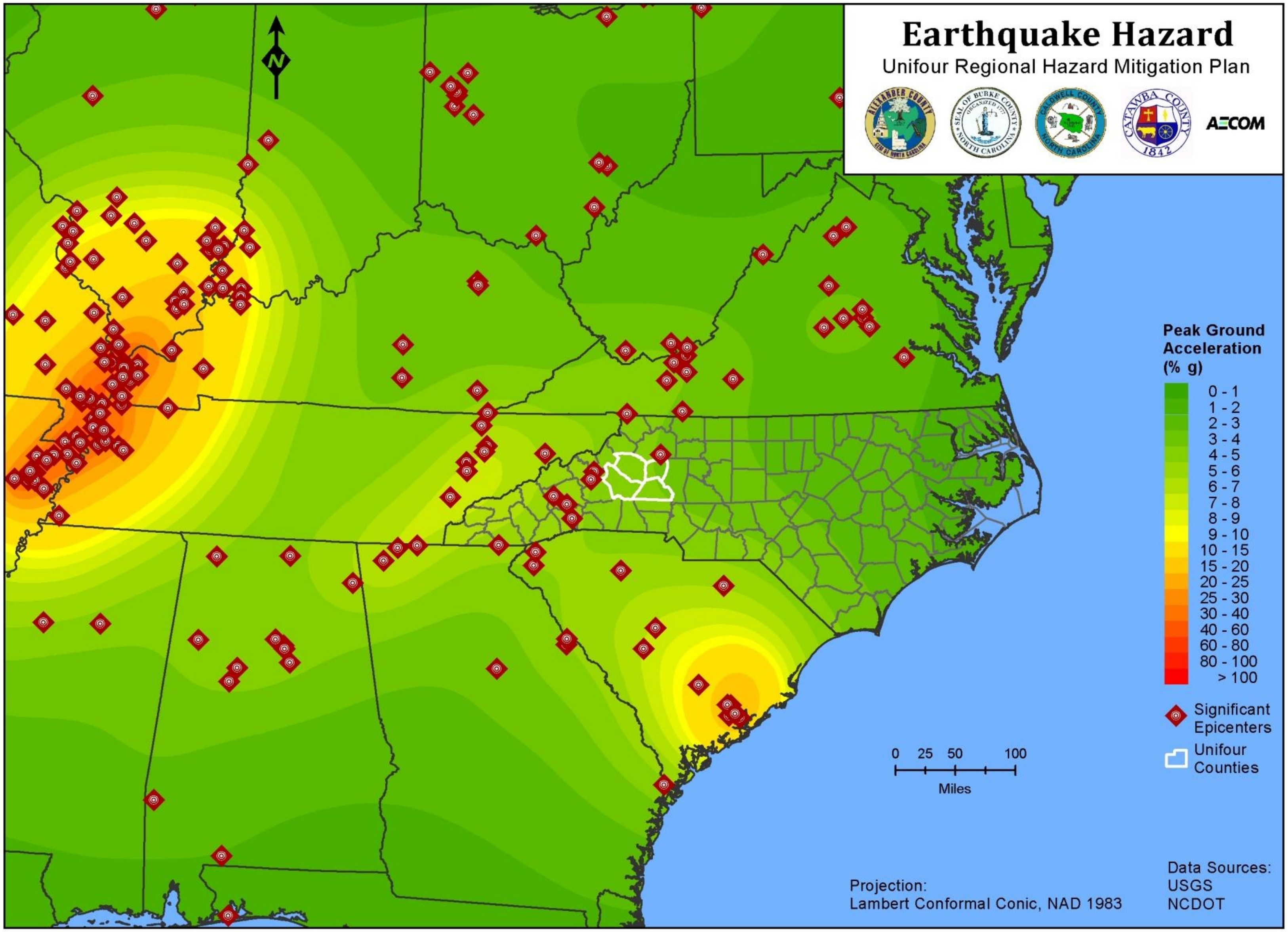
## Earthquake Hazard Analysis

Approximately two-thirds of North Carolina is subject to earthquakes, with the western and southeast region most vulnerable to a very damaging earthquake. The state is affected by both the Charleston Fault in South Carolina and the New Madrid Fault in Tennessee. Both of these faults have generated earthquakes measuring greater than 8 on the Richter Scale during the last 200 years. In addition, there are several smaller fault lines throughout North Carolina.

### *Location Within the Planning Area*

**Figure 4.44** shows peak ground acceleration and historic earthquake epicenters for the state of North Carolina and relevant surrounding areas.

**Figure 4.44: Peak Ground Acceleration and Historic Epicenters Relevant to the Unifour Region**



### *Extent (Magnitude and Severity)*

The most severe earthquake felt in the Unifour Region since the mid-1800s was a six (VI) on the Modified Mercalli Intensity Scale. This event occurred in 1886, the effects of which were reported specifically in the City of Hickory which was 337 miles from the epicenter of the earthquake. The affects of this magnitude earthquake typically include trees swaying, suspended objects swinging, and objects falling off of shelves. Earthquakes of greater magnitude may be possible within the region, however this is known to be the greatest severity currently on record.

### *Historical Occurrences*

The following 10 historical occurrences ranging from 1886 to 2013 have been identified based on the National Geophysical Data Center (NGDC) Earthquake Intensity Database (**Table 4.35**). It should be noted that only those historical occurrences listed in the NGDC database are shown here and that other, unrecorded or unreported events may have occurred within the planning area during this timeframe.

**Table 4.35: Historical Occurrences of Earthquake**

| Date | Location | Intensity (MMI) | Details |
|---|---|---|---|
| 09/01/1886 | Hickory | VI | 337 miles from epicenter |
| 02/21/1916 | Hickory | V | 107 miles from epicenter |
| 08/26/1916 | Newton | IV | 42 miles from epicenter |
| 11/03/1928 | Newton | III | 130 miles from epicenter |
| 05/13/1957 | Claremont | IV | 76 miles from epicenter |
| 05/13/1957 | Conover | IV | 70 miles from epicenter |
| 05/13/1957 | Hickory | V | 59 miles from epicenter |
| 05/13/1957 | Maiden | IV | 73 miles from epicenter |
| 05/13/1957 | Newton | IV | 71 miles from epicenter |
| 09/13/1976 | Long View | II | 109 miles from epicenter |

*Source: National Geophysical Data Center/World Data Service (NGDC/WDS) Significant Earthquake Database.*

### *Probability of Future Occurrences*

The probability of significant, damaging earthquake events affecting the Unifour Region is considered to be unlikely. However, it is likely that future earthquakes resulting in light to moderate perceived shaking and damages ranging from none to very light may affect the region.

## Earthquake Hazard Vulnerability

Due to the relatively low probability of an earthquake occurrence producing significant damages in the participating jurisdictions, a detailed vulnerability assessment was not conducted for this hazard.

### 4.5.3.3 Sinkhole

**Sinkhole Hazard Description**

There are three general types of sinkholes known to occur in North Carolina: geologic, debris-related, and infrastructure failure-related. Typical geologic sinkholes are directly related to the dissolving of limestone or other carbonate rocks by rain water which has become slightly acidic from contact with either tannic acid from leaf litter or acids emitted from the burning of fossil fuels. This is the process of how caverns are formed. The surface water melts the carbonate as the water percolates downward. When a cavern is created, the thickness of the remaining carbonate continues to diminish until the weight of the cover rock exceeds the strength of the cover rock. The hole which is created can be circular or elongated.

The second type of sinkhole is one that is debris-related and is caused by the decomposition of building materials such as buried wood. Many times a circular sinkhole develops along a newly paved or widened road, where a tree was cut down but the root ball was never removed. When the root ball rots, the pavement collapses.

The final type of sinkhole is one associated with the failure of buried infrastructure, such as pipes, culverts, or the settling of soil used to cover buried power lines, cables, water lines, or sewer lines. In most cases, sinkholes associated with settling are from recently buried pipes or utility lines, where the cover material was not completely compacted and settled naturally over time. Significant infrastructure failure-related sinkholes are also caused by water (stormwater, potable water, or sewer) which carries soil and sediment from a crack, hole, or other point of failure in a pipe. The failure of a stormwater pipe can be dramatic because, during storm events when there are high water flows, there can be very rapid erosion of the soil and fill material used to cover buried pipes.

In addition to the sinkhole causes explained above, there is a fourth potential cause of ground collapse in North Carolina and that is mine collapse. While not specifically considered a sinkhole occurrence, the effects are similar.

**Sinkhole Hazard Analysis**

***Location Within the Planning Area***

The geologic formations under Alexander, Burke, Caldwell, and Catawba counties are composed of igneous and metamorphic granitic rocks, which are not the types of rocks which can be dissolved by acidic water. Therefore, geologic sinkholes are not a significant concern for the planning area.

Debris and infrastructure-related sinkholes are largely dependant upon undocumented human activity, construction practices, and natural course of events and therefore no portions of the planning area can be specifically mapped as known sinkhole hazard areas.

***Extent (Magnitude and Severity)***

Sinkholes are typically small, highly localized events that can have a varied magnitude and severity based on a wide range of site-specific variables.

***Historical Occurrences***

There is limited historical information available on previous sinkhole occurrences in the planning area, however **Table 4.36** shows four events that have occurred in Catawba County (specifically in the City of Hickory) since 2002. Each event was the result of collapse of buried infrastructure.

**Table 4.36: Historical Occurrences of Sinkhole**

| Date | Location | Details |
|---|---|---|
| 08/17/2002 | 1100 Hwy 70 SE, Hickory | Known for having swallowed a Corvette and being in litigation for years. Hole was closed and filled in and reappeared in July 2005. |
| 07/2005 | 1340 Hwy 321 NW, Hickory | Parking lot/foundation of building collapsing into sinkhole. |
| 05/19/2011 | 1975 Hwy 70 SE, Hickory | Opened on one lane of five-lane road. |
| 07/30/2013 | 3200 20th Avenue SE, Hickory | Sinkhole in road post-flood. |

*Source: Catawba County Emergency Management.*

***Probability of Future Occurrences***

Due to the multiple potential causes of sinkholes and a lack of historical and risk assessment data from which to prepare calculations, it is unknown what the probability of future occurrences within the planning area is likely to be.

## Sinkhole Hazard Vulnerability

Due to what is assumed to be a relatively low probability of a sinkhole occurrence producing significant damages in the participating jurisdictions, as well as insufficient data and methodology to produce a region-wide assessment, a detailed vulnerability analysis was not conducted for this hazard.

## 4.5.4 Other Hazards

The wildfire hazard does not fit into any of the hazard classifications described above (hydrologic, atmospheric, and geologic). Therefore, wildfire is presented here under the category of "Other Hazards."

## 4.5.4.1 Wildfire

### Wildfire Hazard Description

A wildfire is any fire occurring in a wildland area (e.g., grassland, forest, brush land) except for fire under prescription. Wildfires are part of the natural management of forest ecosystems, but may also be caused by human factors. Nationally, over 80% of forest fires are started by negligent human behavior such as smoking in wooded areas or improperly extinguishing campfires. The second most common cause for wildfire is lightning.

There are three classes of wildland fires: surface fire, ground fire, and crown fire. A surface fire is the most common of these three classes and burns along the floor of a forest, moving slowly and killing or damaging trees. A ground fire (muck fire) is usually started by lightning or human carelessness and burns on or below the forest floor. Crown fires spread rapidly by wind and move quickly by jumping along the tops of trees. Wildland fires are usually signaled by dense smoke that fills the area for miles around.

Wildfire probability depends on local weather conditions, outdoor activities such as camping, debris burning, and construction, and the degree of public cooperation with fire prevention measures. Drought conditions and other natural hazards (tornadoes, hurricanes, etc.) increase the probability of wildfires by producing fuel in both urban and rural settings. Forest damage from hurricanes and tornadoes may also block interior access roads and fire breaks, pull down overhead power lines, or damage pavement and underground utilities.

Wildfires can cause significant damage to property and threatens the lives of people who are unable to evacuate wildfire-prone areas. Many individual homes and cabins, subdivisions, resorts, recreational areas, organizational camps, businesses, and industries are located within high wildfire hazard areas. Further, the increasing demand for outdoor recreation places more people in wildlands during holidays, weekends, and vacation periods. Unfortunately, wildland residents and visitors are rarely educated or prepared for wildfire events that can sweep through the brush and timber and destroy property within minutes.

Wildfires can result in severe economic losses. Businesses that depend on timber, such as paper mills and lumber companies, experience losses that are often passed along to consumers through higher prices, and sometimes jobs are lost. The high cost of responding to and recovering from wildfires can deplete state resources and increase insurance rates. The economic impact of wildfires can also be felt in the tourism industry if roads and tourist attractions are closed due to health and safety concerns, such as reduced air quality by means of wildfire smoke and ash.

### Wildfire Hazard Analysis

The entire region is at risk to a wildfire occurrence. However, drought conditions may make a fire more likely in certain locations under certain conditions. Further, areas in the urban-wildland interface are particularly susceptible to fire hazards as populations inhabit formerly undeveloped areas.

### *Location Within the Planning Area*

In an effort to identify specific potential wildfire hazard areas within the planning area, a GIS-based data layer called the Wildland Fire Susceptibility Index (WFSI) was obtained from the North Carolina Division of Forest Resources (NCDFR). The WFSI is a component layer derived from the Southern Wildfire Risk Assessment (SWRA), a multi-year project to assess and quantify wildfire risk for the 13 Southern states. The WFSI is a value between 0 and 1. It was developed consistent with the mathematical calculation process for determining the probability of an acre burning. The WFSI integrates the probability of an acre igniting and the expected final fire size based on the rate of spread in four weather percentile categories into a single measure of wildland fire susceptibility. Due to some necessary assumptions, mainly fuel homogeneity, it is not the true probability. But since all areas of the planning area have this value determined consistently, it allows for comparison and ordination of areas as to the likelihood of an acre burning.

**Figures 4.45** through **4.49** illustrates the level of wildfire potential for the planning area based on the WFSI data provided by NCDFR. Areas with a WFSI value of 0.01–0.05 were considered to be at moderate risk to the wildfire hazard. Areas with a WFSI value greater than 0.05 were considered to be at high risk to the wildfire hazard. Areas with a WFSI value less than 0.01 were considered to not be at risk to the wildfire hazard.

### *Extent (Magnitude and Severity)*

The average size of wildfires in the Unifour Region is typically small.

### *Historical Occurrences*

According to statistics provided by NCDFR, the 5-year average number of fires for the Unifour area was 1,197. The 5-year average number of acres burned was 1,082.4. Based on these statistics, it can be estimated that the Unifour Region experiences an average of 239 wildfire events per year. The leading cause of fires in Alexander County is debris burning (49%). The leading cause in Burke County is "miscellaneous" (e.g., downed power lines, an electric fence, stove ashes, or structure fires) (27%). The leading cause in Caldwell County is miscellaneous as well (36%). The leading cause in Catawba County is debris burning (55%). Other causes of fires in the planning area include children and incendiary. There are no known records of any deaths, injuries, or significant property damage attributed to a wildfire event in the planning area. **Table 4.37** shows a breakdown of averages by participating county area.

**Table 4.37: Historical Occurrences of Wildfire**

| County | 5-Year Average Number of Fires | 5-Year Average Number of Acres Burned |
|---|---|---|
| Alexander | 163 | 133.5 |
| Burke | 286 | 221.2 |
| Caldwell | 472 | 614.8 |
| Catawba | 276 | 112.9 |
| **TOTAL UNIFOUR** | **1,197** | **1,082.4** |

*Source: North Carolina Division of Forest Resources.*

### *Probability of Future Occurrences*

It is assumed that wildfire occurrences of these types and magnitudes will continue to be likely in the planning area.

**Figure 4.45: Wildfire Hazard Areas in the Unifour Region**

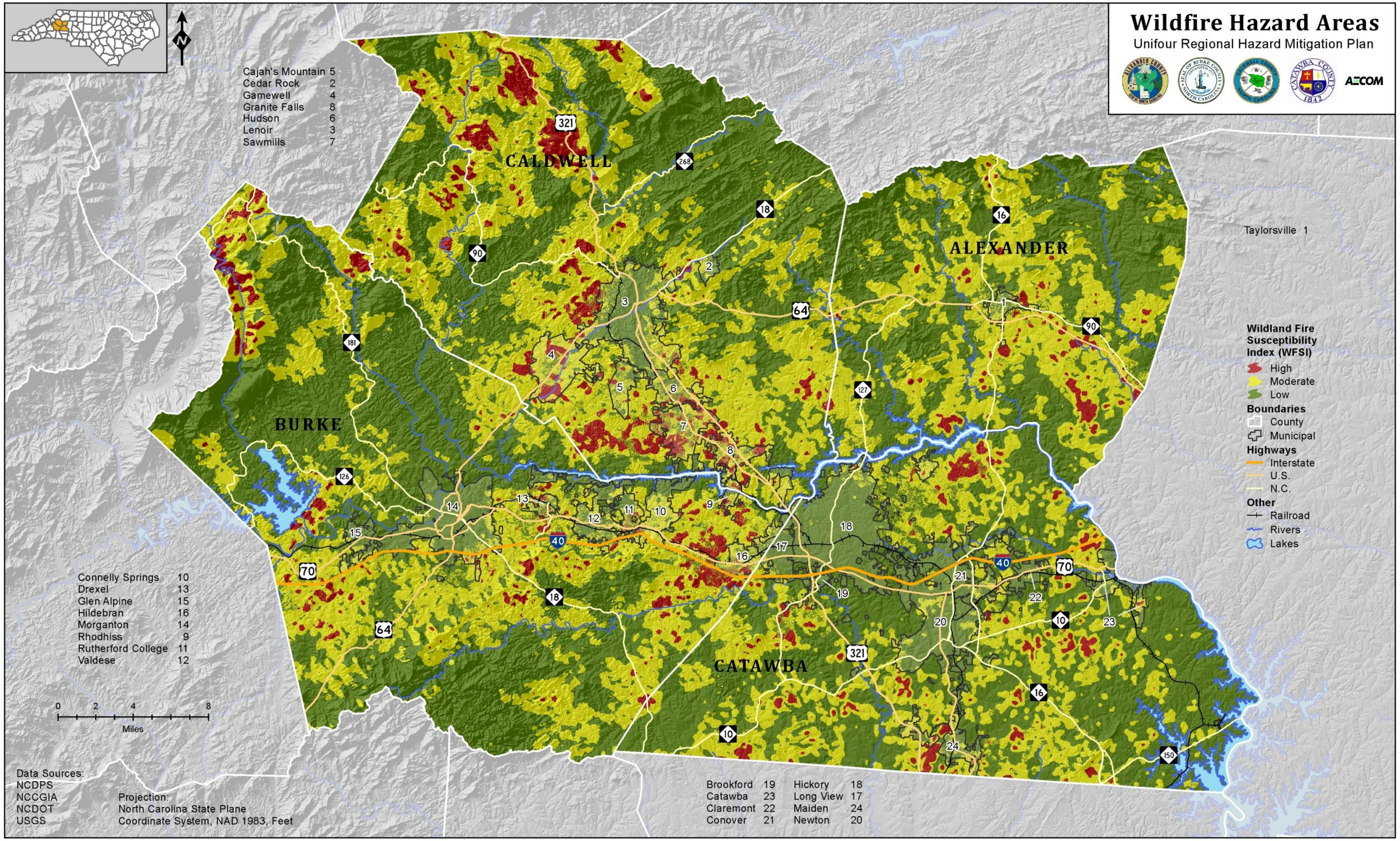


**Figure 4.45: Wildfire Hazard Areas in Alexander County**

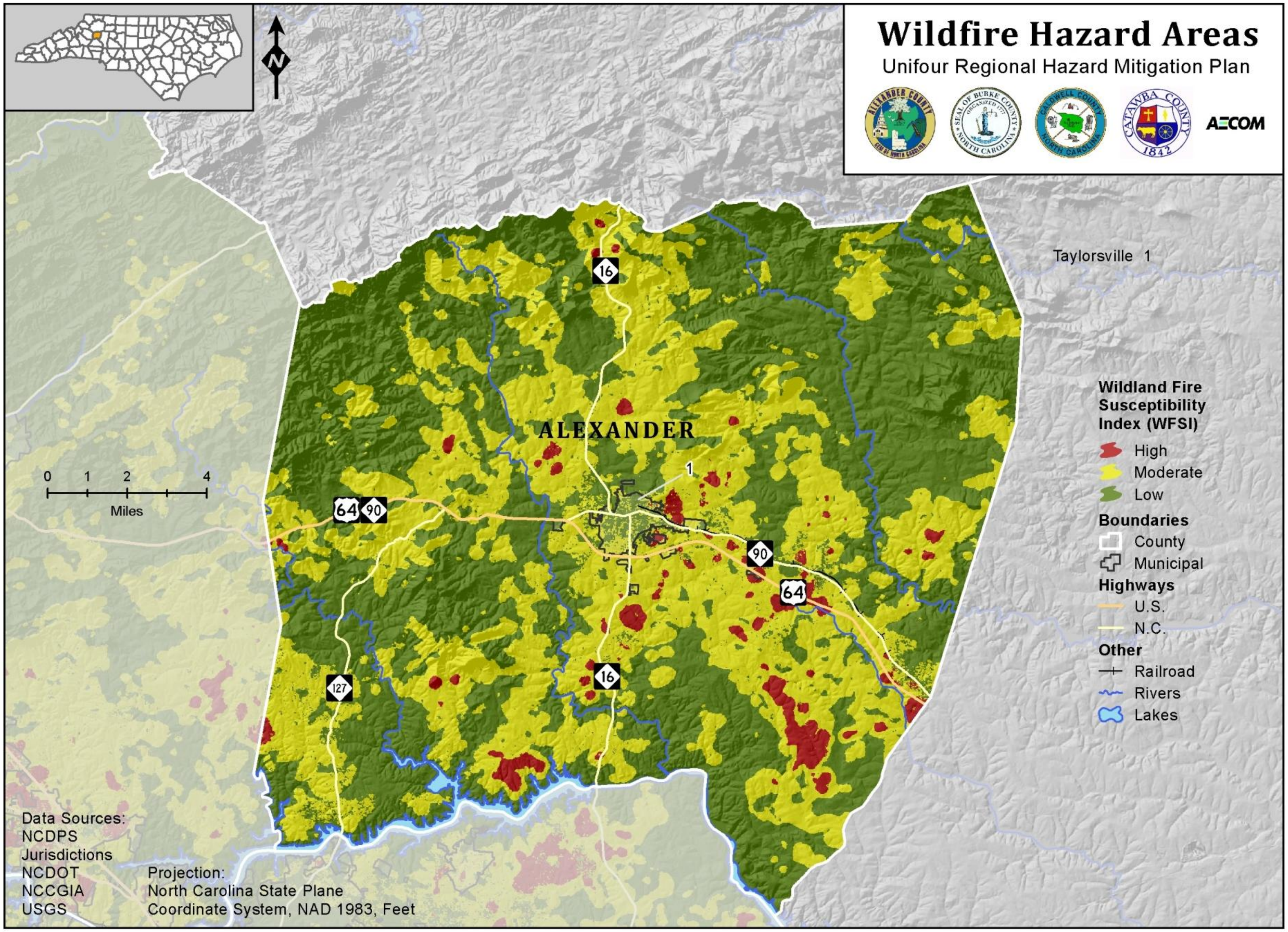


**Figure 4.46: Wildfire Hazard Areas in Burke County**

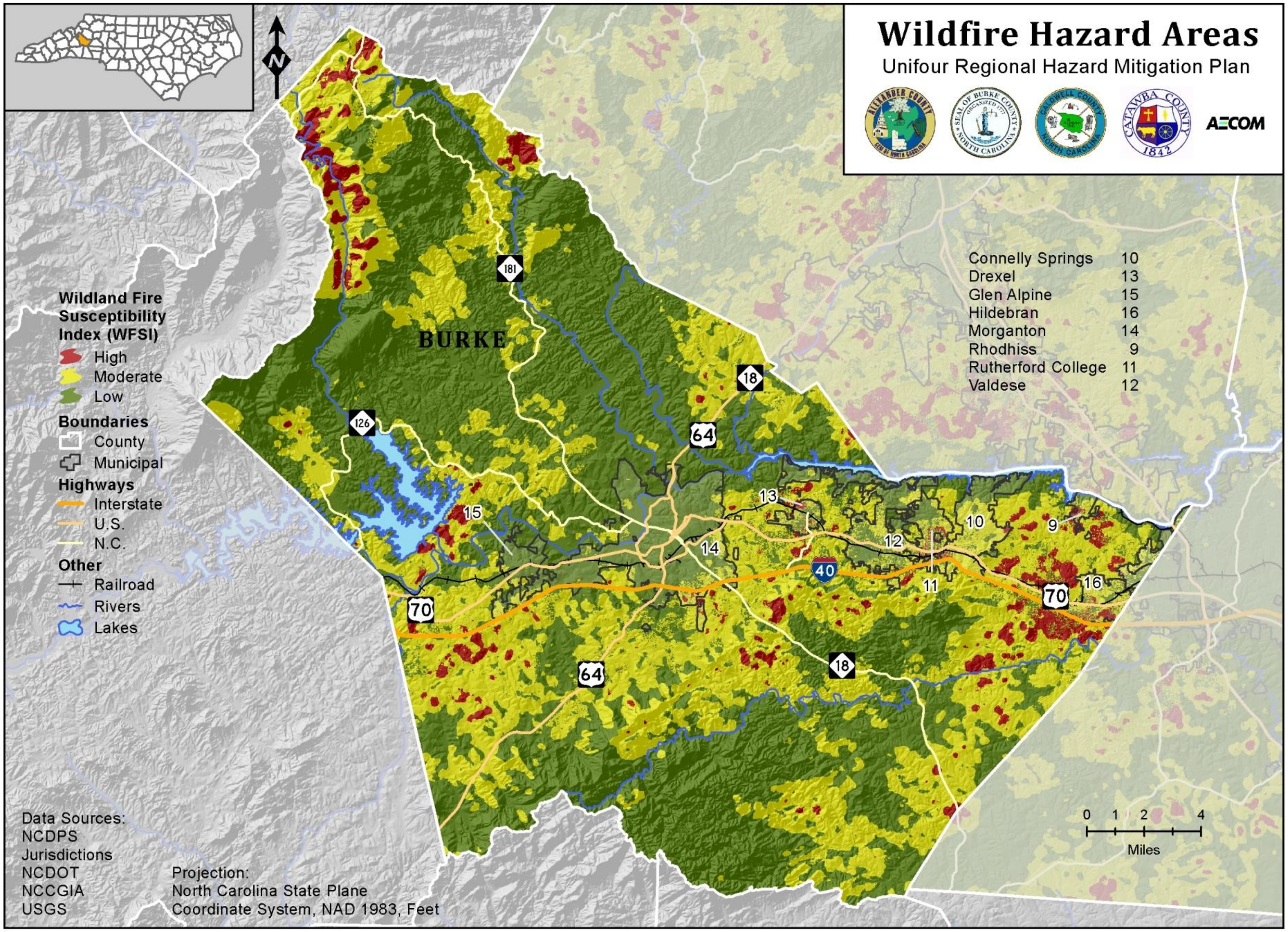


**Figure 4.47: Wildfire Hazard Areas in Caldwell County**

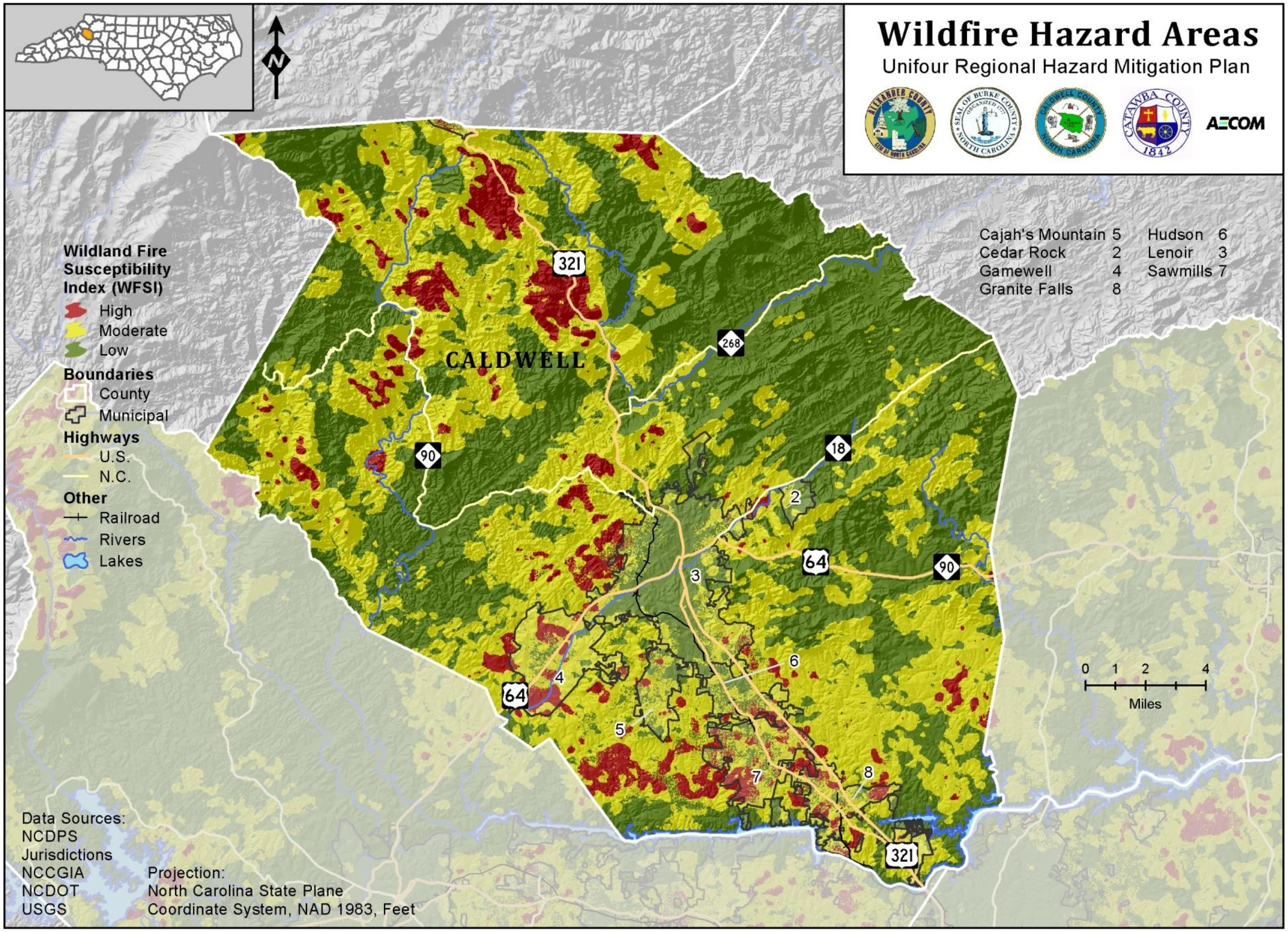
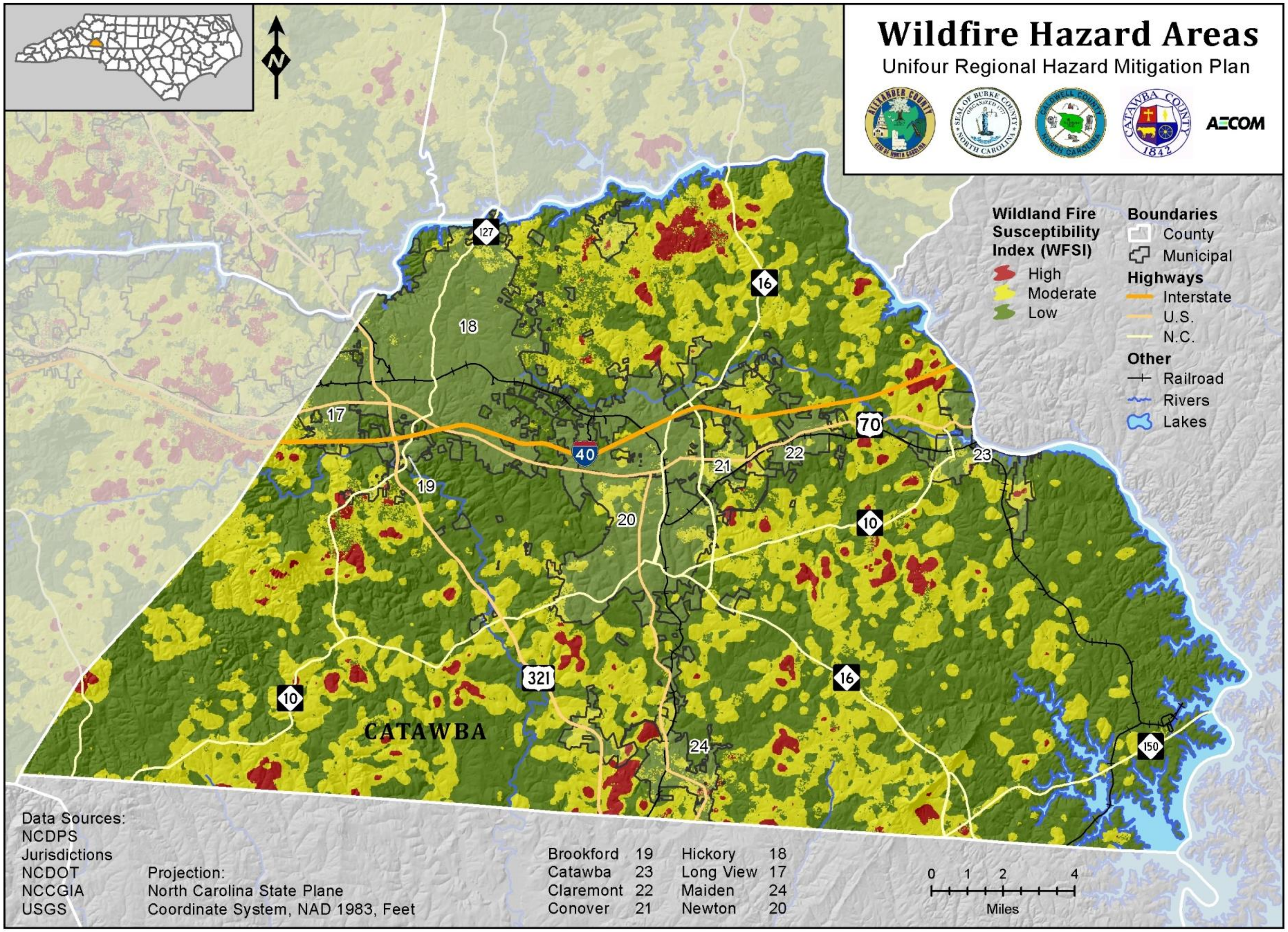


**Figure 4.48: Wildfire Hazard Areas in Catawba County**



## Wildfire Hazard Vulnerability

The following tables provide counts and values by jurisdiction relevant to wildfire hazard vulnerability in the Unifour Region.

### Table 4.38: Exposure to Wildfire High Hazard Areas

| Jurisdiction | Number of Developed Parcels At Risk | | Number of Undeveloped Parcels At Risk | | Number of Buildings At Risk | | Value of Buildings At Risk | Population At Risk | | Elderly Population At Risk | | Children At Risk | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Num | Per | Num | Per | Num | Per | | Num | Per | Num | Per | Num | Per |
| **Alexander County (Unincorporated Area)** | **985** | **6.03%** | **337** | **5.29%** | **1,018** | **3.89%** | **$101,165,250** | **1,787** | **5.09%** | **188** | **3.68%** | **100** | **4.87%** |
| Taylorsville | 32 | 3.05% | 9 | 3.98% | 23 | 1.74% | $1,864,360 | 20 | 0.95% | 1 | 0.19% | 3 | 1.95% |
| *Subtotal Alexander* | *1,017* | *5.85%* | *346* | *5.24%* | *1,041* | *3.78%* | *$103,029,610* | *1,807* | *4.86%* | *189* | *3.36%* | *103* | *4.66%* |
| **Burke County (Unincorporated Area)** | **2,913** | **12.31%** | **1,529** | **8.91%** | **2,763** | **8.51%** | **$175,033,270** | **4,238** | **7.11%** | **600** | **6.77%** | **218** | **7.07%** |
| Connelly Springs | 60 | 8.89% | 28 | 4.97% | 39 | 4.54% | $7,015,756 | 65 | 3.89% | 18 | 6.23% | 3 | 3.49% |
| Drexel | 167 | 24.67% | 43 | 22.75% | 83 | 10.84% | $11,887,524 | 194 | 10.44% | 24 | 6.03% | 8 | 8.51% |
| Glen Alpine | 0 | 0.00% | 0 | 0.00% | 0 | 0.00% | $0 | 0 | 0.00% | 0 | 0.00% | 0 | 0.00% |
| Hildebran | 293 | 36.35% | 88 | 33.46% | 222 | 21.02% | $23,620,954 | 232 | 11.47% | 32 | 8.04% | 8 | 6.78% |
| Morganton | 2 | 0.03% | 2 | 0.11% | 12 | 0.17% | $0 | 72 | 0.43% | 3 | 0.10% | 0 | 0.00% |
| Valdese | 20 | 1.10% | 7 | 0.71% | 10 | 0.48% | $18,607,576 | 34 | 0.76% | 24 | 2.67% | 0 | 0.00% |
| Rutherford College | 183 | 32.39% | 70 | 30.30% | 117 | 16.43% | $10,506,245 | 129 | 9.62% | 17 | 7.26% | 4 | 5.13% |
| *Subtotal Burke* | *3,638* | *10.44%* | *1,767* | *8.21%* | *3,246* | *7.07%* | *$246,671,325* | *4,964* | *5.46%* | *718* | *4.98%* | *241* | *4.84%* |
| **Caldwell County (Unincorporated Area)** | **2,970** | **15.07%** | **1,320** | **12.41%** | **2,857** | **10.94%** | **$196,778,600** | **4,172** | **9.59%** | **633** | **10.31%** | **204** | **9.01%** |
| Cajah's Mountain | 62 | 5.55% | 19 | 7.85% | 51 | 3.83% | $3,545,600 | 80 | 2.83% | 15 | 2.89% | 4 | 2.17% |
| Cedar Rock | 0 | 0.00% | 0 | 0.00% | 0 | 0.00% | $0 | 0 | 0.00% | 0 | 0.00% | 0 | 0.00% |
| Gamewell | 441 | 28.38% | 90 | 21.33% | 435 | 21.25% | $35,040,700 | 927 | 22.88% | 122 | 19.52% | 47 | 21.86% |
| Granite Falls | 629 | 32.93% | 184 | 26.32% | 484 | 24.26% | $84,303,500 | 1,064 | 22.53% | 169 | 25.34% | 55 | 16.57% |

| Jurisdiction | Number of Developed Parcels At Risk | | Number of Undeveloped Parcels At Risk | | Number of Buildings At Risk | | Value of Buildings At Risk | Population At Risk | | Elderly Population At Risk | | Children At Risk | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Num | Per | Num | Per | Num | Per | | Num | Per | Num | Per | Num | Per |
| Hudson | 222 | 14.61% | 64 | 15.09% | 149 | 8.95% | $17,241,100 | 276 | 7.31% | 39 | 5.95% | 8 | 3.92% |
| Lenoir | 348 | 4.49% | 96 | 4.28% | 273 | 3.17% | $23,813,200 | 617 | 3.38% | 106 | 3.14% | 39 | 3.52% |
| Rhodhiss | 166 | 37.90% | 50 | 26.88% | 143 | 29.67% | $5,864,762 | 243 | 22.71% | 32 | 21.48% | 13 | 19.40% |
| Sawmills | 866 | 46.11% | 204 | 36.11% | 758 | 29.08% | $53,176,800 | 1,229 | 23.45% | 152 | 21.81% | 56 | 18.54% |
| *Subtotal Caldwell* | *5,704* | *15.83%* | *2,027* | *13.07%* | *5,150* | *11.45%* | *$419,764,262* | *8,608* | *10.37%* | *1,268* | *9.89%* | *426* | *9.17%* |
| **Catawba County (Unincorporated Area)** | **2,320** | **6.06%** | **552** | **4.13%** | **2,454** | **4.45%** | **$196,264,900** | **3,059** | **3.66%** | **366** | **3.29%** | **185** | **3.85%** |
| Brookford | 0 | 0.00% | 0 | 0.00% | 0 | 0.00% | $0 | 0 | 0.00% | 0 | 0.00% | 0 | 0.00% |
| Catawba | 8 | 2.04% | 9 | 5.08% | 2 | 0.43% | $3,698,700 | 4 | 0.66% | 1 | 0.77% | 0 | 0.00% |
| Claremont | 1 | 0.13% | 1 | 0.46% | 3 | 0.37% | $17,100 | 0 | 0.00% | 0 | 0.00% | 0 | 0.00% |
| Conover | 21 | 0.61% | 6 | 0.65% | 17 | 0.43% | $1,782,900 | 44 | 0.54% | 2 | 0.14% | 5 | 0.89% |
| Hickory | 68 | 0.46% | 33 | 0.97% | 43 | 0.26% | $21,495,700 | 90 | 0.22% | 9 | 0.16% | 4 | 0.15% |
| Long View | 19 | 0.85% | 9 | 1.94% | 13 | 0.50% | $807,905 | 14 | 0.29% | 1 | 0.13% | 1 | 0.29% |
| Maiden | 92 | 5.77% | 28 | 6.29% | 61 | 3.14% | $7,287,200 | 50 | 1.51% | 5 | 1.10% | 2 | 0.96% |
| Newton | 52 | 0.99% | 16 | 1.33% | 47 | 0.74% | $5,665,100 | 151 | 1.16% | 11 | 0.54% | 14 | 1.47% |
| *Subtotal Catawba* | *2,581* | *3.86%* | *654* | *3.23%* | *2,640* | *3.00%* | *$237,019,505* | *3,412* | *2.21%* | *395* | *1.81%* | *211* | *2.18%* |
| **TOTAL UNIFOUR** | **12,940** | **8.34%** | **4,794** | **7.51%** | **12,077** | **5.85%** | **$1,006,484,702** | **18,791** | **5.14%** | **2,570** | **4.70%** | **981** | **4.56%** |

*Source: GIS analysis.*

**Table 4.39: Exposure to Wildfire Moderate Hazard Areas**

| Jurisdiction | Number of Developed Parcels At Risk | | Number of Undeveloped Parcels At Risk | | Number of Buildings At Risk | | Value of Buildings At Risk | Population At Risk | | Elderly Population At Risk | | Children At Risk | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Num | Per | Num | Per | Num | Per | | Num | Per | Num | Per | Num | Per |
| **Alexander County (Unincorporated Area)** | **9,582** | **58.69%** | **3,574** | **56.07%** | **13,420** | **51.24%** | **$642,579,255** | **16,710** | **47.61%** | **2,378** | **46.61%** | **941** | **45.79%** |
| Taylorsville | 697 | 66.38% | 151 | 66.81% | 598 | 45.17% | $77,454,849 | 788 | 37.56% | 206 | 39.24% | 51 | 33.12% |
| *Subtotal Alexander* | *10,279* | *59.16%* | *3,725* | *56.44%* | *14,018* | *50.94%* | *$720,034,104* | *17,498* | *47.04%* | *2,584* | *45.92%* | *992* | *44.91%* |
| **Burke County (Unincorporated Area)** | **15,603** | **65.94%** | **10,100** | **58.87%** | **19,227** | **59.19%** | **$1,119,818,508** | **33,332** | **55.95%** | **4,766** | **53.76%** | **1,724** | **55.88%** |
| Connelly Springs | 576 | 85.33% | 257 | 45.65% | 726 | 84.52% | $34,883,060 | 1,212 | 72.62% | 203 | 70.24% | 58 | 67.44% |
| Drexel | 394 | 58.20% | 113 | 59.79% | 370 | 48.30% | $42,133,302 | 829 | 44.62% | 180 | 45.23% | 27 | 28.72% |
| Glen Alpine | 90 | 14.11% | 28 | 9.12% | 60 | 8.30% | $3,319,141 | 107 | 7.05% | 25 | 9.80% | 6 | 5.77% |
| Hildebran | 458 | 56.82% | 162 | 61.60% | 602 | 57.01% | $58,047,893 | 1,150 | 56.85% | 222 | 55.78% | 57 | 48.31% |
| Morganton | 680 | 11.34% | 283 | 15.54% | 681 | 9.37% | $190,080,202 | 1,494 | 8.83% | 284 | 9.22% | 79 | 6.87% |
| Valdese | 1,075 | 58.87% | 505 | 51.53% | 838 | 40.46% | $118,424,350 | 1,598 | 35.59% | 308 | 34.22% | 78 | 29.43% |
| Rutherford College | 292 | 51.68% | 129 | 55.84% | 342 | 48.03% | $28,697,776 | 588 | 43.85% | 93 | 39.74% | 33 | 42.31% |
| *Subtotal Burke* | *19,168* | *55.01%* | *11,577* | *53.82%* | *22,846* | *49.74%* | *$1,595,404,232* | *40,310* | *44.34%* | *6,081* | *42.18%* | *2,062* | *41.41%* |
| **Caldwell County (Unincorporated Area)** | **11,904** | **60.41%** | **5,641** | **53.02%** | **14,707** | **56.31%** | **$868,803,200** | **23,873** | **54.88%** | **3,218** | **52.40%** | **1,240** | **54.77%** |
| Cajah's Mountain | 890 | 79.68% | 179 | 73.97% | 875 | 65.79% | $82,280,600 | 1,667 | 59.05% | 283 | 54.53% | 111 | 60.33% |
| Cedar Rock | 85 | 57.82% | 43 | 51.81% | 71 | 50.71% | $18,860,400 | 127 | 42.33% | 40 | 43.01% | 1 | 14.29% |
| Gamewell | 1,079 | 69.43% | 327 | 77.49% | 1,444 | 70.54% | $83,773,700 | 2,549 | 62.92% | 388 | 62.08% | 131 | 60.93% |
| Granite Falls | 1,091 | 57.12% | 357 | 51.07% | 1,168 | 58.55% | $136,654,850 | 2,569 | 54.40% | 341 | 51.12% | 176 | 53.01% |
| Hudson | 930 | 61.22% | 298 | 70.28% | 867 | 52.10% | $170,287,500 | 1,748 | 46.29% | 288 | 43.97% | 94 | 46.08% |
| Lenoir | 2,954 | 38.09% | 845 | 37.64% | 2,537 | 29.49% | $323,470,600 | 4,387 | 24.07% | 787 | 23.33% | 190 | 17.13% |
| Rhodhiss | 193 | 44.06% | 95 | 51.08% | 219 | 45.44% | $15,882,660 | 571 | 53.36% | 75 | 50.34% | 38 | 56.72% |
| Sawmills | 811 | 43.18% | 270 | 47.79% | 1,246 | 47.79% | $72,909,600 | 2,416 | 46.11% | 301 | 43.19% | 114 | 37.75% |

| Jurisdiction | Number of Developed Parcels At Risk | | Number of Undeveloped Parcels At Risk | | Number of Buildings At Risk | | Value of Buildings At Risk | Population At Risk | | Elderly Population At Risk | | Children At Risk | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Num | Per | Num | Per | Num | Per | | Num | Per | Num | Per | Num | Per |
| *Subtotal Caldwell* | *19,937* | *55.34%* | *8,055* | *51.95%* | *23,134* | *51.42%* | *$1,772,923,110* | *39,907* | *48.06%* | *5,721* | *44.64%* | *2,095* | *45.10%* |
| **Catawba County (Unincorporated Area)** | **18,934** | **49.42%** | **5,661** | **42.39%** | **23,420** | **42.43%** | **$1,946,856,500** | **31,030** | **37.15%** | **3,943** | **35.45%** | **1,726** | **35.89%** |
| Brookford | 16 | 6.75% | 4 | 7.84% | 20 | 6.78% | $950,400 | 31 | 8.12% | 8 | 11.11% | 2 | 11.11% |
| Catawba | 165 | 42.09% | 56 | 31.64% | 152 | 32.83% | $14,758,300 | 162 | 26.87% | 31 | 23.85% | 7 | 25.93% |
| Claremont | 115 | 15.39% | 43 | 19.82% | 89 | 10.87% | $27,295,600 | 99 | 7.32% | 8 | 4.08% | 3 | 3.90% |
| Conover | 701 | 20.28% | 241 | 26.03% | 644 | 16.32% | $127,067,800 | 1,025 | 12.55% | 119 | 8.57% | 73 | 12.97% |
| Hickory | 1,811 | 12.36% | 502 | 14.79% | 1,411 | 8.69% | $439,071,050 | 2,926 | 7.31% | 280 | 4.88% | 156 | 5.74% |
| Long View | 373 | 16.69% | 126 | 27.10% | 280 | 10.71% | $25,450,483 | 482 | 9.90% | 51 | 6.62% | 31 | 9.04% |
| Maiden | 887 | 55.61% | 275 | 61.80% | 783 | 40.28% | $95,862,700 | 1,031 | 31.15% | 119 | 26.10% | 54 | 25.96% |
| Newton | 769 | 14.59% | 197 | 16.40% | 743 | 11.69% | $170,120,500 | 1,274 | 9.82% | 310 | 15.08% | 81 | 8.48% |
| *Subtotal Catawba* | *23,771* | *35.53%* | *7,105* | *35.12%* | *27,542* | *31.34%* | *$2,847,433,333* | *38,060* | *24.66%* | *4,869* | *22.36%* | *2,133* | *22.06%* |
| **TOTAL UNIFOUR** | **73,155** | **47.15%** | **30,462** | **47.71%** | **87,540** | **42.43%** | **$6,935,794,779** | **135,775** | **37.15%** | **19,255** | **35.24%** | **7,282** | **33.86%** |

*Source: GIS analysis.*

**Table 4.40: Numbers of Critical Facilities Exposed to Wildfire High Hazard Areas**

| Jurisdiction | Day Care | EMS | EOCs | Fire Stations | Govt. Buildings | Hospitals | Police Stations | Schools | Senior Care | Shelters |
|---|---|---|---|---|---|---|---|---|---|---|
| **Alexander County (Unincorporated Area)** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **1** | **0** |
| Taylorsville | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| *Subtotal Alexander* | *0* | *0* | *0* | *0* | *0* | *0* | *0* | *0* | *1* | *0* |
| **Burke County (Unincorporated Area)** | **0** | **0** | **0** | **1** | **0** | **0** | **0** | **1** | **1** | **1** |
| Connelly Springs | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Drexel | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| Glen Alpine | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Hildebran | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Morganton | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| Valdese | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Rutherford College | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| *Subtotal Burke* | *0* | *0* | *0* | *1* | *0* | *0* | *0* | *2* | *1* | *2* |
| **Caldwell County (Unincorporated Area)** | **3** | **0** | **0** | **0** | **0** | **0** | **0** | **1** | **0** | **2** |
| Cajah's Mountain | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Cedar Rock | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Gamewell | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 |
| Granite Falls | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 |
| Hudson | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Lenoir | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 |
| Rhodhiss | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Sawmills | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| *Subtotal Caldwell* | *8* | *0* | *0* | *1* | *2* | *0* | *0* | *2* | *0* | *3* |
| **Catawba County (Unincorporated Area)** | **3** | **0** | **0** | **1** | **0** | **0** | **0** | **3** | **0** | **1** |
| Brookford | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Catawba | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Claremont | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Conover | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Hickory | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Long View | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Maiden | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Newton | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| *Subtotal Catawba* | *3* | *0* | *0* | *1* | *0* | *0* | *0* | *3* | *0* | *1* |
| **TOTAL UNIFOUR** | **11** | **0** | **0** | **3** | **2** | **0** | **0** | **7** | **2** | **6** |

*Source: Critical facilities supplied by participating jurisdictions.*

**Table 4.41: Numbers of Critical Facilities Exposed to Wildfire Moderate Hazard Areas**

| Jurisdiction | Day Care | EMS | EOCs | Fire Stations | Govt. Buildings | Hospitals | Police Stations | Schools | Senior Care | Shelters |
|---|---|---|---|---|---|---|---|---|---|---|
| **Alexander County (Unincorporated Area)** | **8** | **2** | **0** | **4** | **2** | **0** | **0** | **3** | **1** | **2** |
| Taylorsville | 0 | 0 | 0 | 0 | 1 | 0 | 2 | 1 | 0 | 0 |
| *Subtotal Alexander* | *8* | *2* | *0* | *4* | *3* | *0* | *2* | *4* | *1* | *2* |
| **Burke County (Unincorporated Area)** | **0** | **1** | **0** | **7** | **0** | **0** | **0** | **5** | **4** | **9** |
| Connelly Springs | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| Drexel | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 |
| Glen Alpine | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Hildebran | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 |
| Morganton | 0 | 1 | 0 | 0 | 0 | 1 | 1 | 3 | 1 | 1 |
| Valdese | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 2 | 0 | 1 |
| Rutherford College | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| *Subtotal Burke* | *0* | *3* | *0* | *8* | *0* | *2* | *1* | *12* | *6* | *13* |
| **Caldwell County (Unincorporated Area)** | **16** | **0** | **0** | **1** | **0** | **0** | **0** | **6** | **0** | **7** |
| Cajah's Mountain | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 |
| Cedar Rock | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Gamewell | 7 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 |
| Granite Falls | 3 | 0 | 0 | 0 | 1 | 0 | 1 | 1 | 2 | 1 |
| Hudson | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 1 |
| Lenoir | 5 | 0 | 1 | 0 | 2 | 0 | 1 | 1 | 0 | 1 |
| Rhodhiss | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| Sawmills | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| *Subtotal Caldwell* | *37* | *3* | *1* | *2* | *3* | *0* | *2* | *11* | *3* | *11* |
| **Catawba County (Unincorporated Area)** | **27** | **1** | **0** | **2** | **0** | **0** | **0** | **7** | **0** | **8** |
| Brookford | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Catawba | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Claremont | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Conover | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| Hickory | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 |
| Long View | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Maiden | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Newton | 3 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 1 | 1 |
| *Subtotal Catawba* | *34* | *1* | *0* | *3* | *0* | *0* | *0* | *9* | *2* | *10* |
| **TOTAL UNIFOUR** | **79** | **9** | **1** | **17** | **6** | **2** | **5** | **36** | **12** | **36** |

*Source: Critical facilities supplied by participating jurisdictions.*

**Table 4.42: Numbers of High Potential Loss Properties Exposed to Wildfire Hazard**

| Jurisdiction | Airports | | Military Facilities | | Hazardous Materials Sites | | Other | |
|---|---|---|---|---|---|---|---|---|
| | High | Mod. | High | Mod. | High | Mod. | High | Mod. |
| **Alexander County (Unincorporated Area)** | **0** | **3** | **0** | **0** | **0** | **1** | **0** | **0** |
| Taylorsville | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| *Subtotal Alexander* | *0* | *3* | *0* | *0* | *0* | *1* | *0* | *0* |
| **Burke County (Unincorporated Area)** | **0** | **0** | **0** | **0** | **0** | **1** | **0** | **0** |
| Connelly Springs | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Drexel | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Glen Alpine | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Hildebran | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Morganton | 0 | 2 | 0 | 0 | 0 | 1 | 0 | 0 |
| Valdese | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Rutherford College | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| *Subtotal Burke* | *0* | *2* | *0* | *0* | *0* | *2* | *0* | *0* |
| **Caldwell County (Unincorporated Area)** | **0** | **2** | **0** | **1** | **0** | **1** | **0** | **0** |
| Cajah's Mountain | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Cedar Rock | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Gamewell | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Granite Falls | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| Hudson | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| Lenoir | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 |
| Rhodhiss | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Sawmills | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| *Subtotal Caldwell* | *0* | *2* | *0* | *1* | *0* | *2* | *0* | *0* |
| **Catawba County (Unincorporated Area)** | **0** | **2** | **0** | **0** | **0** | **6** | **0** | **0** |
| Brookford | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Catawba | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Claremont | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Conover | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Hickory | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 |
| Long View | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Maiden | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| Newton | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 |
| *Subtotal Catawba* | *0* | *3* | *0* | *1* | *0* | *7* | *0* | *0* |
| **TOTAL UNIFOUR** | **0** | **10** | **0** | **2** | **0** | **12** | **0** | **0** |

*Source: GIS analysis.*

**Table 4.43: Numbers of Historic Properties Exposed to the Wildfire Hazard Areas**

| Jurisdiction | Districts | | Buildings | | Other | |
|---|---|---|---|---|---|---|
| | Mod | High | Mod | High | Mod | High |
| **Alexander County (Unincorporated Area)** | **0** | **0** | **0** | **0** | **0** | **0** |
| Taylorsville | 0 | 0 | 0 | 0 | 0 | 0 |
| *Subtotal Alexander* | *0* | *0* | *0* | *0* | *0* | *0* |
| **Burke County (Unincorporated Area)** | **0** | **0** | **3** | **0** | **0** | **0** |
| Connelly Springs | 0 | 0 | 0 | 0 | 0 | 0 |
| Drexel | 0 | 0 | 0 | 0 | 0 | 0 |
| Glen Alpine | 0 | 0 | 0 | 0 | 0 | 0 |
| Hildebran | 0 | 0 | 0 | 0 | 0 | 0 |
| Morganton | 1 | 0 | 0 | 0 | 0 | 0 |
| Valdese | 0 | 0 | 0 | 0 | 0 | 0 |
| Rutherford College | 0 | 0 | 0 | 0 | 0 | 0 |
| *Subtotal Burke* | *1* | *0* | *3* | *0* | *0* | *0* |
| **Caldwell County (Unincorporated Area)** | **2** | **0** | **2** | **0** | **0** | **0** |
| Cajah's Mountain | 0 | 0 | 0 | 0 | 0 | 0 |
| Cedar Rock | 0 | 0 | 0 | 0 | 0 | 0 |
| Gamewell | 0 | 0 | 0 | 0 | 0 | 0 |
| Granite Falls | 0 | 0 | 0 | 0 | 0 | 0 |
| Hudson | 0 | 0 | 0 | 0 | 0 | 0 |
| Lenoir | 0 | 0 | 1 | 0 | 0 | 0 |
| Rhodhiss | 0 | 0 | 0 | 0 | 0 | 0 |
| Sawmills | 0 | 0 | 0 | 0 | 0 | 0 |
| *Subtotal Caldwell* | *2* | *0* | *3* | *0* | *0* | *0* |
| **Catawba County (Unincorporated Area)** | **8** | **0** | **6** | **0** | **0** | **0** |
| Brookford | 0 | 0 | 0 | 0 | 0 | 0 |
| Catawba | 0 | 0 | 0 | 0 | 0 | 0 |
| Claremont | 0 | 0 | 0 | 0 | 0 | 0 |
| Conover | 0 | 0 | 0 | 0 | 0 | 0 |
| Hickory | 0 | 0 | 0 | 0 | 0 | 0 |
| Long View | 0 | 0 | 0 | 0 | 0 | 0 |
| Maiden | 0 | 0 | 0 | 0 | 0 | 0 |
| Newton | 0 | 0 | 1 | 0 | 0 | 0 |
| *Subtotal Catawba* | *8* | *0* | *7* | *0* | *0* | *0* |
| **TOTAL UNIFOUR** | **11** | **0** | **13** | **0** | **0** | **0** |

*Source: GIS analysis.*

## 4.6 Conclusions on Hazard Risk

Based on consensus of the Hazard Mitigation Planning Committee, primarily at the third HMPC meeting, in addition to the results presented in this *Risk Assessment*, the hazards addressed in this plan have been ranked according to the following prioritized list:

**High Risk Hazards**
- Flood
- Tornado
- Winter Weather
- Thunderstorm, Lightning, and Hail

**Moderate Risk Hazards**
- Wildfire
- Sinkhole
- Dam/Levee Failure
- Drought/Extreme Heat

**Low Risk Hazards**
- Erosion
- Landslide
- Hurricane and Tropical Storm

The HMPC has agreed to focus on the high risk hazards identified above for purposes of mitigation strategy development. The list above is also consistent with Annualized Loss Estimates (ALEs) calculated for the planning area which point to the same four high risk hazards, although in a slightly different order:

- Tornado
- Flood
- Thunderstorm, Lightning, and Hail
- Winter Weather

In addition to the results presented throughout this *Risk Assessment*, the annualized losses presented in **Table 4.44** and summarized above further help substantiate the priority ranking stated here in these conclusions on hazard risk.

**Table 4.44: Annualized Loss Estimates (ALEs) by Hazard by Jurisdiction**

| Jurisdiction | Flood | Erosion | Dam/Levee Failure | Drought/ Extreme Heat | Thunderstorm | Tornado | Winter Weather | Hurricane and Tropical Storm | Landslide | Earthquake | Sinkholes | Wildfire |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Alexander County (Unincorporated Area)** | **$5,000** | **Neg*** | **Neg** | **Neg** | **$12,150** | **$68,750** | **NA**** | **Neg** | **Neg** | **Neg** | **Neg** | **Neg** |
| Taylorsville | $0 | Neg | Neg | Neg | $55,000 | $7,500 | NA | Neg | Neg | Neg | Neg | Neg |
| *Subtotal Alexander* | *$5,000* | *Neg* | *Neg* | *Neg* | *$67,150* | *$76,250* | *$50,000* | *Neg* | *Neg* | *Neg* | *Neg* | *Neg* |
| **Burke County (Unincorporated Area)** | **$450,100** | **Neg** | **Neg** | **Neg** | **$52,000** | **$706,250** | **NA** | **Neg** | **Neg** | **Neg** | **Neg** | **Neg** |
| Connelly Springs | $0 | Neg | Neg | Neg | $0 | $0 | NA | Neg | Neg | Neg | Neg | Neg |
| Drexel | $0 | Neg | Neg | Neg | $0 | $0 | NA | Neg | Neg | Neg | Neg | Neg |
| Glen Alpine | $0 | Neg | Neg | Neg | $2,500 | $0 | NA | Neg | Neg | Neg | Neg | Neg |
| Hildebran | $0 | Neg | Neg | Neg | $0 | $0 | NA | Neg | Neg | Neg | Neg | Neg |
| Morganton | $215 | Neg | Neg | Neg | $9,150 | $0 | NA | Neg | Neg | Neg | Neg | Neg |
| Valdese | $0 | Neg | Neg | Neg | $0 | $0 | NA | Neg | Neg | Neg | Neg | Neg |
| Rutherford College | $0 | Neg | Neg | Neg | $1,250 | $0 | NA | Neg | Neg | Neg | Neg | Neg |
| *Subtotal Burke* | *$450,315* | *Neg* | *Neg* | *Neg* | *$64,900* | *$706,250* | *$100* | *Neg* | *Neg* | *Neg* | *Neg* | *Neg* |
| **Caldwell County (Unincorporated Area)** | **$131,500** | **Neg** | **Neg** | **Neg** | **$5,000** | **$85,000** | **NA** | **Neg** | **Neg** | **Neg** | **Neg** | **Neg** |
| Cajah's Mountain | $0 | Neg | Neg | Neg | $0 | $0 | NA | Neg | Neg | Neg | Neg | Neg |
| Cedar Rock | $0 | Neg | Neg | Neg | $0 | $0 | NA | Neg | Neg | Neg | Neg | Neg |
| Gamewell | $0 | Neg | Neg | Neg | $0 | $0 | NA | Neg | Neg | Neg | Neg | Neg |
| Granite Falls | $0 | Neg | Neg | Neg | $1,000 | $0 | NA | Neg | Neg | Neg | Neg | Neg |
| Hudson | $0 | Neg | Neg | Neg | $5,000 | $0 | NA | Neg | Neg | Neg | Neg | Neg |
| Lenoir | $6,500 | Neg | Neg | Neg | $6,850 | $0 | NA | Neg | Neg | Neg | Neg | Neg |

| Jurisdiction | Flood | Erosion | Dam/Levee Failure | Drought/ Extreme Heat | Thunderstorm | Tornado | Winter Weather | Hurricane and Tropical Storm | Landslide | Earthquake | Sinkholes | Wildfire |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Rhodhiss | $0 | Neg | Neg | Neg | $0 | $0 | NA | Neg | Neg | Neg | Neg | Neg |
| Sawmills | $0 | Neg | Neg | Neg | $150 | $0 | NA | Neg | Neg | Neg | Neg | Neg |
| *Subtotal Caldwell* | *$138,000* | *Neg* | *Neg* | *Neg* | *$13,000* | *$85,000* | *$0* | *Neg* | *Neg* | *Neg* | *Neg* | *Neg* |
| **Catawba County (Unincorporated Area)** | **$8,000** | **Neg** | **Neg** | **Neg** | **$5,750** | **$1,305,450** | **NA** | **Neg** | **Neg** | **Neg** | **Neg** | **Neg** |
| Brookford | $0 | Neg | Neg | Neg | $0 | $0 | NA | Neg | Neg | Neg | Neg | Neg |
| Catawba | $0 | Neg | Neg | Neg | $1,000 | $0 | NA | Neg | Neg | Neg | Neg | Neg |
| Claremont | $1,000 | Neg | Neg | Neg | $4,250 | $330,500 | NA | Neg | Neg | Neg | Neg | Neg |
| Conover | $0 | Neg | Neg | Neg | $550 | $0 | NA | Neg | Neg | Neg | Neg | Neg |
| Hickory | $153,000 | Neg | Neg | Neg | $22,450 | $1,000 | NA | Neg | Neg | Neg | Neg | Neg |
| Long View | $550 | Neg | Neg | Neg | $500 | $0 | NA | Neg | Neg | Neg | Neg | Neg |
| Maiden | $2,500 | Neg | Neg | Neg | $50 | $0 | NA | Neg | Neg | Neg | Neg | Neg |
| Newton | $0 | Neg | Neg | Neg | $502,850 | $0 | NA | Neg | Neg | Neg | Neg | Neg |
| *Subtotal Catawba* | *$165,050* | *Neg* | *Neg* | *Neg* | *$537,400* | *$1,636,950* | *$50,100* | *Neg* | *Neg* | *Neg* | *Neg* | *Neg* |
| **TOTAL UNIFOUR** | **$758,365** | **Neg** | **Neg** | **Neg** | **$682,450** | **$2,504,450** | **$100,200** | **Neg** | **Neg** | **Neg** | **Neg** | **Neg** |

**"Neg" = "Negligible" which indicates that sufficient historical losses in dollar values were not available to produce an Annualized Loss Estimate (ALE).*
**"NA" = "Not Applicable" which indicates that an ALE is only applicable at the county level.*